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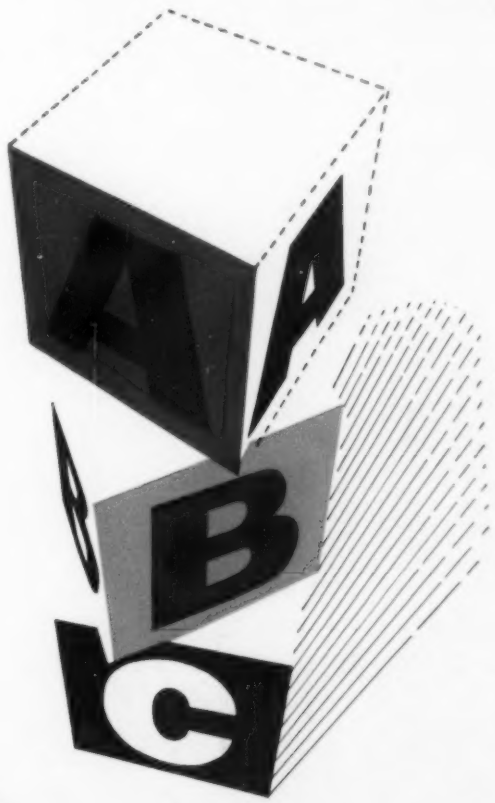

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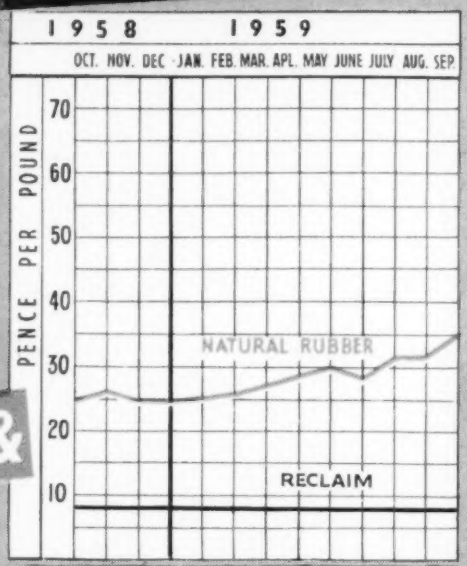

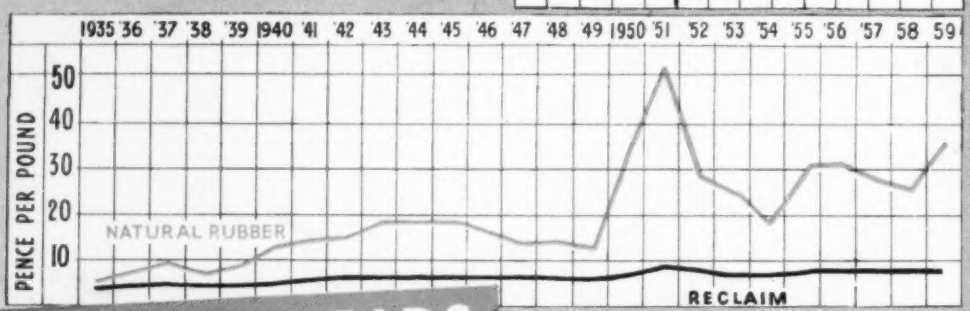

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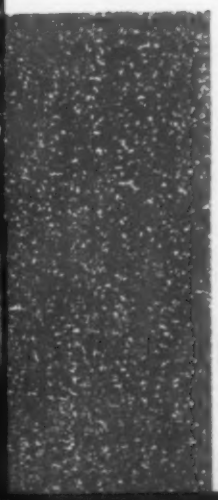

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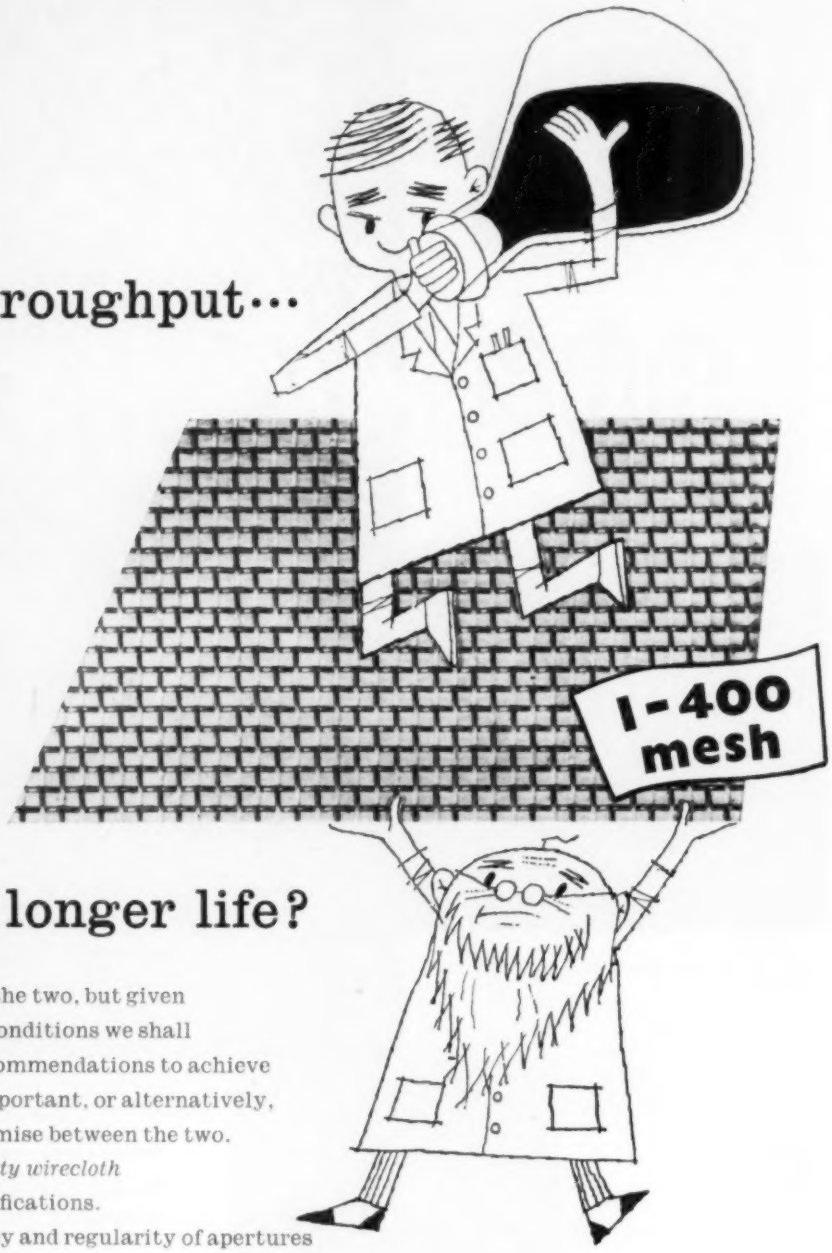

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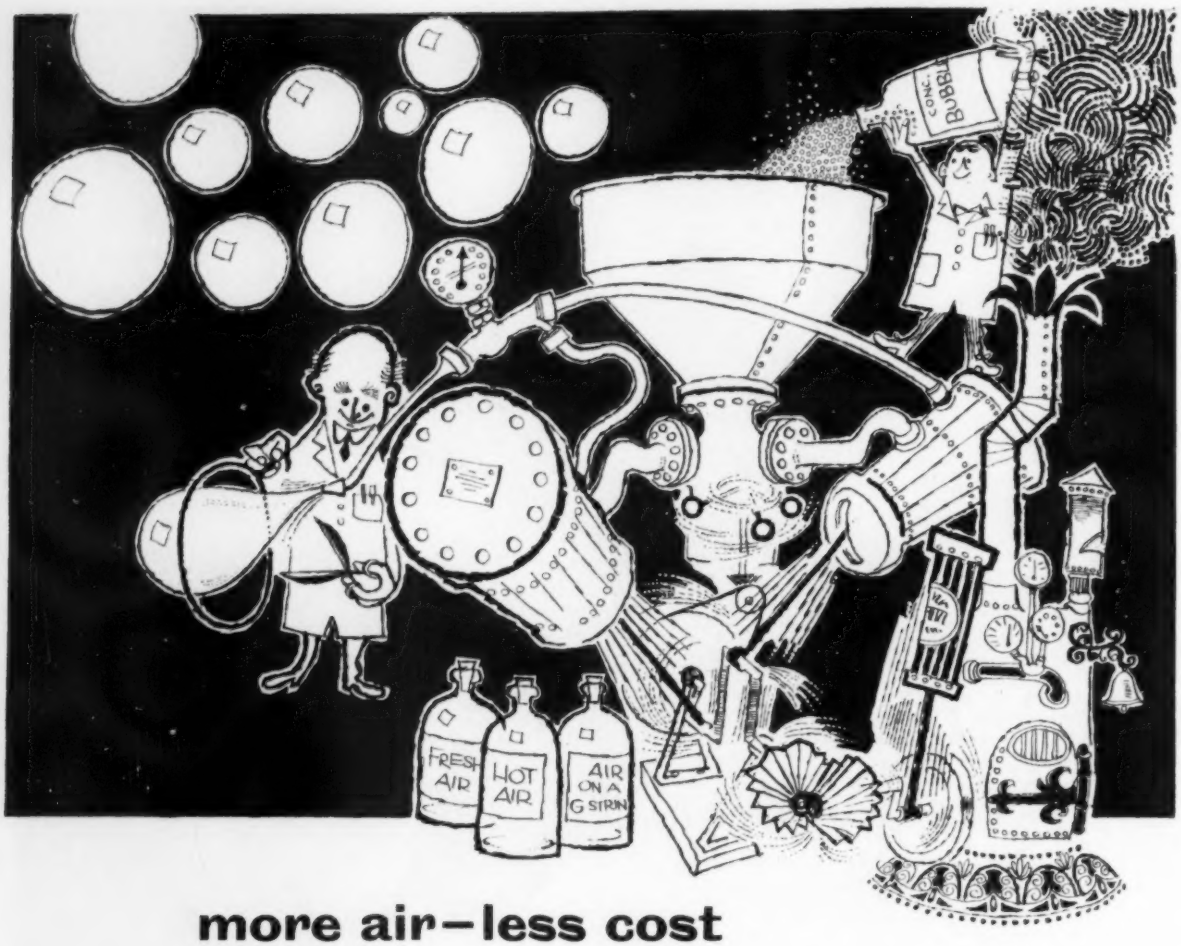

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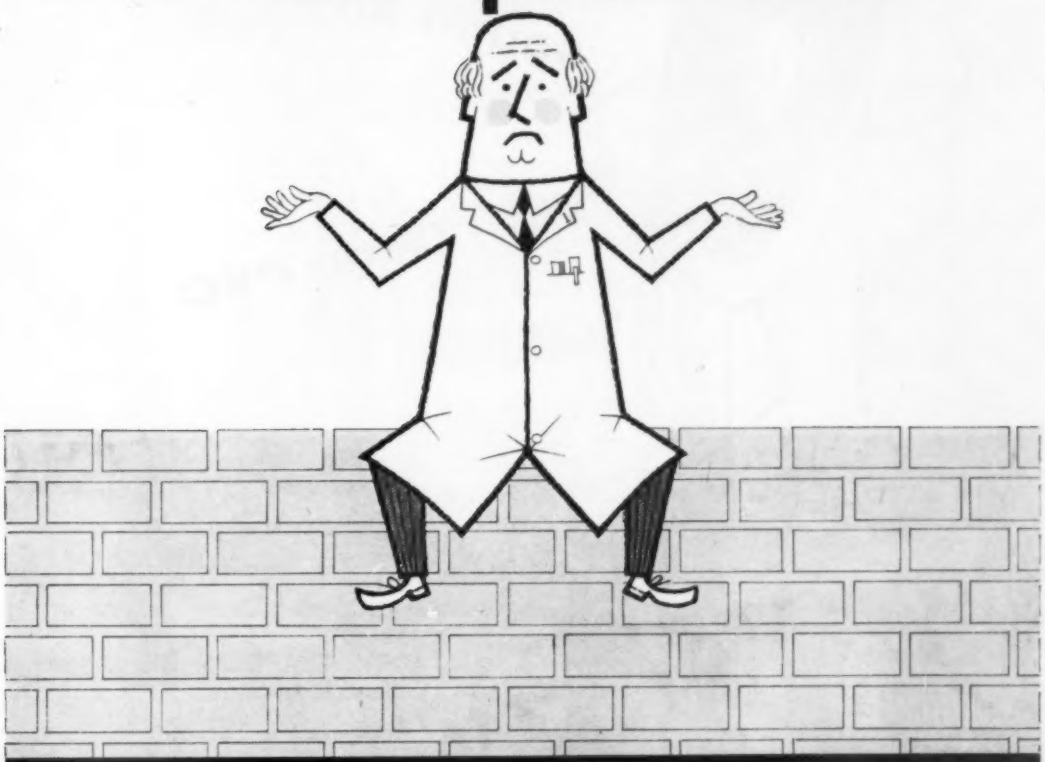

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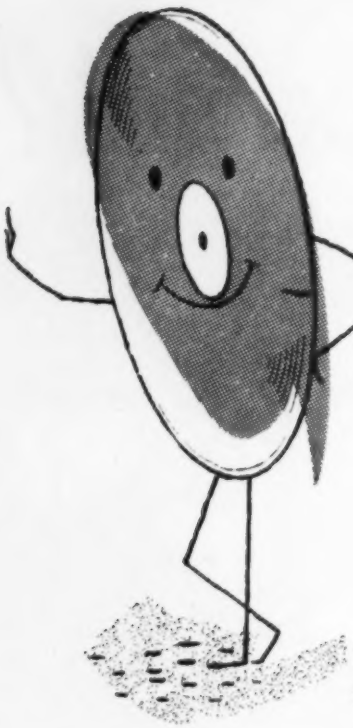

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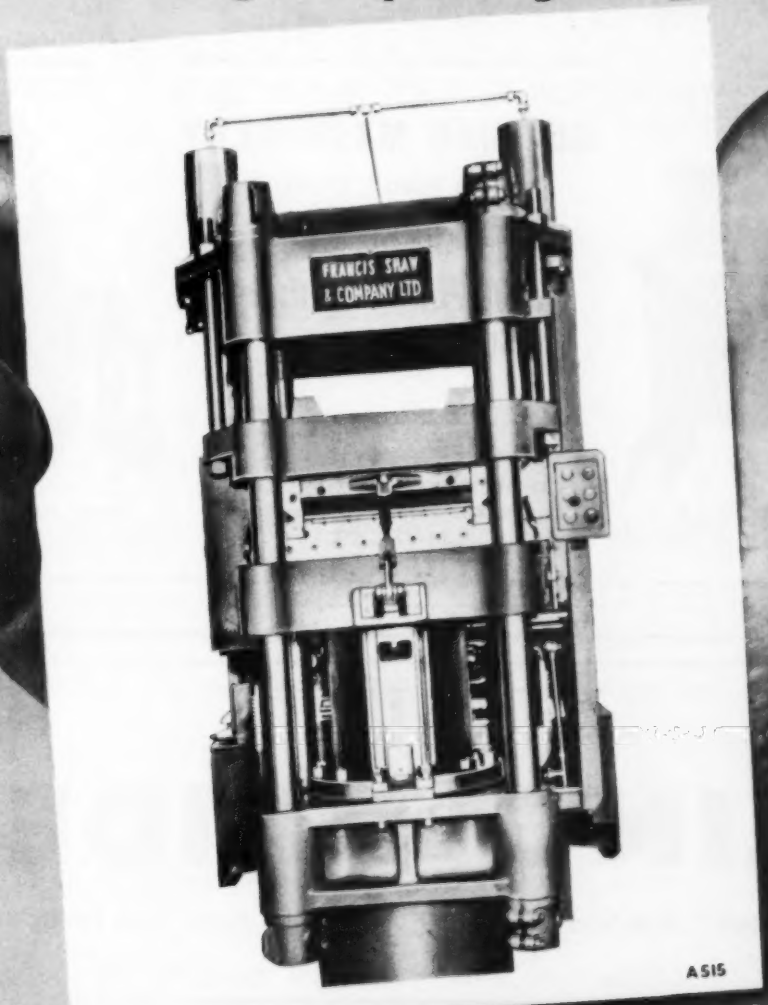

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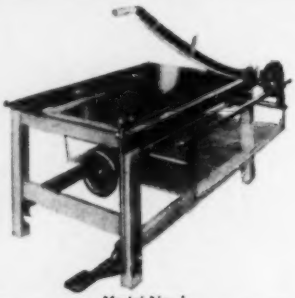

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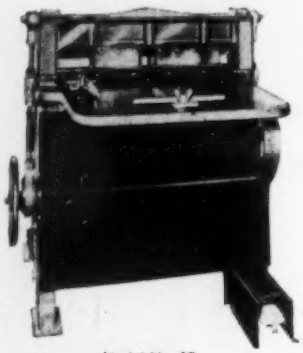

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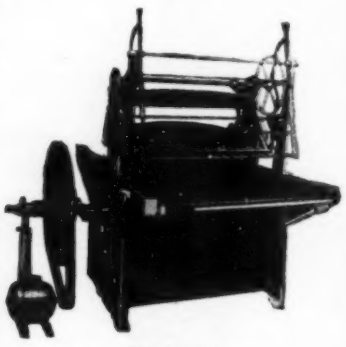

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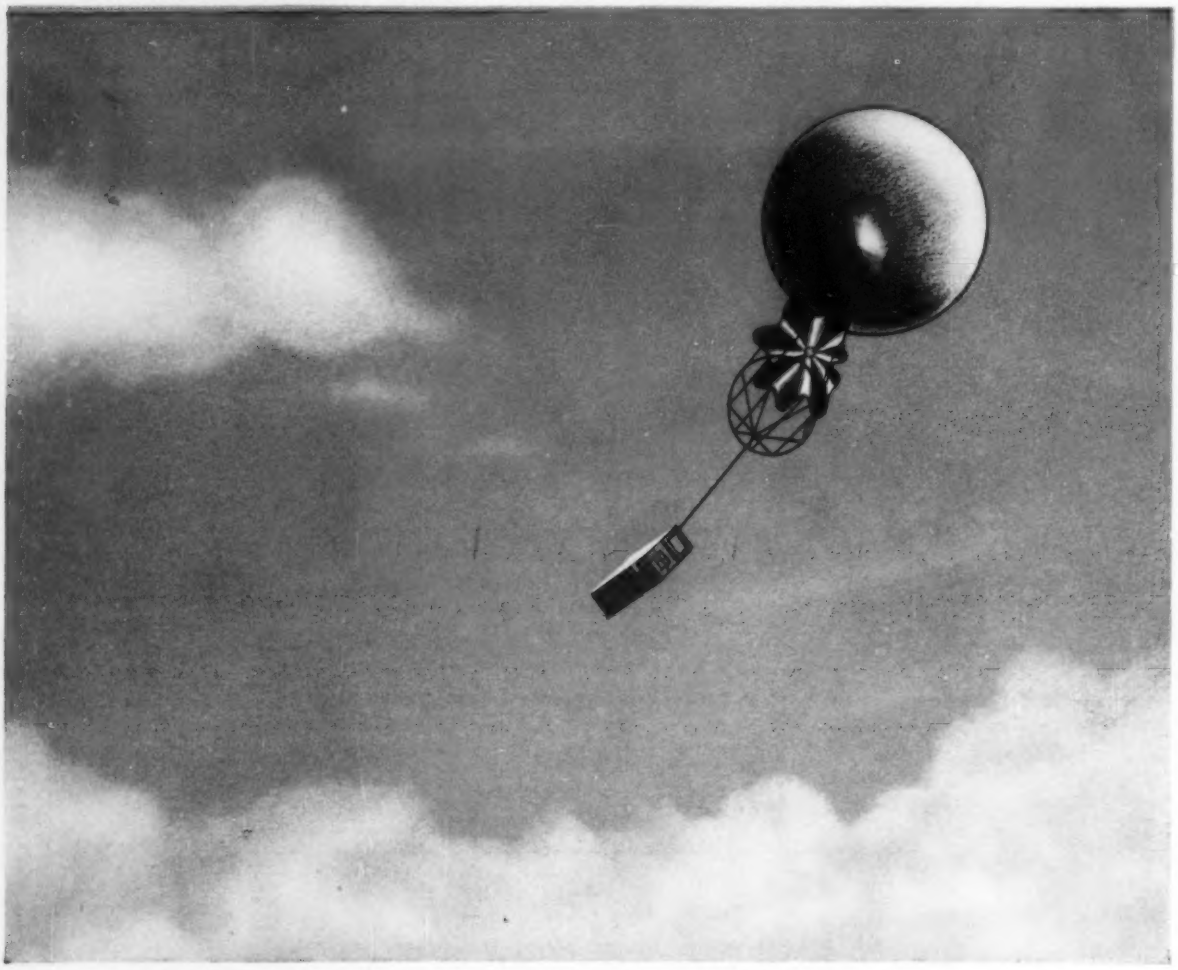

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IN ITS 76th YEAR

May 14 1960

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NOTES of the WEEK

Foreign Address

IT was an excellent move on the part of the committee of the London Section of the Plastics Institute to arrange for a speaker from Russia, Dr M. S. Akutin, director of the Moscow Plastics Institute (reported elsewhere in this issue), to address the Section. Obviously, and in some ways quite apart from knowledge gained or exchanged, there can hardly be too much of this sort of thing. More than ever valuable in this day and age is the meeting of peoples of different nationalities. The time when there will be a freer and fuller interchange of technological information may not yet be with us, but there is always interest in visits such as this and in them, too, is an immense potential for the furtherance of goodwill: which is, of course, the key to, among other things, good business.

Language Trouble

THE slight difficulty over language—not bad language, merely different languages—that arose at the London Section meeting is a problem that must in some way or another be overcome. Apart from a common world language, somewhere ahead perhaps in the midst of time, the ideal solution would be for everybody to speak fluently at least three languages. This is not an impossible target nor even a difficult one and will be made easier as language tuition in schools is extended and improved. The need for personal immediate communication is being increasingly realized by industry and it seems likely that from industry will come the push—as for compulsory education nearly 100 years ago—that will really set things going.

At the London Section meeting, three languages were used: Russian, German and English, but, of course, mostly English. From some points of view it is unfortunate that this should so often be the case. Dr Akutin, who already speaks German besides his native tongue, said that he was studying English and hoped to be proficient by the end of the year. The London Section committee had procured two Russian-speaking Britons, but as neither of these was a chemist some difficulties in translation inevitably arose. There was also a considerable time lag between the asking of a question in English, or German, and the reply in Russian translated into English. This was an interesting, often amusing, but nevertheless time-consuming process. One was reminded of the remarks of Dr Salomon, Central Laboratory, TNO, Delft, at the dinner organized by the Plastics Institute on the occasion of the conference on Polymeric Progress. Mentioning the fact that there was no official interpreter, he said that coming to this country, as opposed to others, was so different for foreigners because we allowed them to use our language. Dr Salomon, whose English is excellent, was speaking light-heartedly, but he made a valid point. Until the happy day of a multitude of multi-lingual citizens, it should really be possible, on these international occasions, to arrange for simultaneous translation. Where meeting rooms are shared, it should also be possible to share the cost.

Publicity

SOME of the national newspapers on May 5 carried a full page advertisement 'Steel—Spring Report to the Nation.' The steel industry has every reason to pat itself on the back. Since the war it has done a phenomenal job. The advertisement, illustrated, informative, interesting, put across impressively details of the industry and some of the people who work in it. The plastics industry, not so old and not yet quite so big, has none the less a story to tell second-to-none in fascination, variety and colour. It might well consider a nation-wide advertising campaign, part of which could be used to explain, in terms as simple as possible, that the industry does not deal in one magnificently all-embracing material but that there are in fact many kinds with widely differing properties.

Rubber Supply and Demand

ESTIMATES for the world supply and consumption of natural rubbers during 1960 were issued last week in the UK and the USA. The differences are as interesting as the similarities. In the UK, the management committee of the International Rubber Study Group estimates world consumption of natural at 2,110,000 long tons. In the USA, the New York *Journal of Commerce* quotes rubber industry spokesmen's estimates of natural consumption as between 2,060,000 and 2,115,000 long tons, and natural production at between 2,065,000 and 2,085,000 long tons. UK estimate of production is 2,135,000 long tons. The greatest difference occurs in estimates of stockpile releases. The UK estimate is a possible 75,000 long tons which compares with the US figure of 100,000 to 150,000 long tons. The US spokesmen consider that natural supply will equal and may exceed demand. The IRSG figures also indicate this, but it is added that a considerable part of any surplus would be required to build up stocks to a more normal level that now obtains. Regarding synthetic rubber, the IRSG estimates production at 1,810,000 long tons in member countries with consumption at 1,750,000 tons. Production capacity of synthetic rubber, in member countries, is assessed at 2,335,000 long tons. These figures dealing with a possible surplus of natural are especially interesting in a week when the London market price rose to its highest level since 1955.

NEWS *Briefs*

STANDARD OIL PRODUCING POLYPROPYLENE
SHELL TO MAKE MORE POLYISOPRENE — BUNA
RAISE CAPACITY — TANGANYIKAN TAKE-OVER

●**United Kingdom**—BTR Industries Ltd., are to manufacture isocyanate foam cushioning (polyether) at the factory of their subsidiary company, Silvertown Rubber Co. Ltd. The announcement was made on May 6 by Dr W. D. Scott, managing director, on the occasion of long service award presentations (reported elsewhere in this issue).

●**China**—China's rubber purchases in the Singapore market in May so far were estimated at 8,000 tons by trade sources. Poland has also been buying rubber in the Singapore market but Soviet buying reported earlier has not been confirmed according to trade quarters.

●**United States**—The Shell Chemical Co. announced it will triple its projected plant capacity for the production of polyisoprene from 40 million to 120 million lb. annually. This will involve construction at a mid-western location of an integrated monomer-polymer plant of 80 million lb. annual capacity. The Shell, Torrance, California, plant is currently being expanded to a capacity of 40 million lb. per year of polyisoprene. Construction is expected to be completed in the autumn.

●**United Kingdom** — The 780-ton Marwit, recently launched and now being equipped by Du Pont (UK) will carry chlorine and neoprene to and from the company's new synthetic rubber plant at Maydown, Northern Ireland.

●**Japan**—The 25,000 tons Houdry Dehydrogenation process unit to produce butadiene at Yokkaichi is now on stream (*RJIP* January 16, 78). The new unit is part of the Japanese Synthetic Rubber Co.'s 45,000 ton plant.

●**Germany**—Extensions to the synthetic rubber plant of Bunawerke Hüls GmbH have enabled the capacity to be raised as from this week to 120,000 tons a year, it was announced at the annual general meeting of the company. The six types up to now manufactured by Hüls are to be increased by the addition of a special type for conveyor belts and another for light coloured rubber articles as well as others still under test. Production of a carbon black rubber, to begin in the fourth quarter of this year, will enable Buna Hüls, now the largest European manufacturer of synthetic rubber, to supply all current types of cold rubber.

●**United Kingdom**—The new factory for Glass Yarns and Deeside Fabrics Ltd. (*RJIP* January 30 1960. 158) is to be officially opened on May 20 by the Rt. Hon. Harold Watkinson, M.P., Minister of Defence. A new factory for Artrite Resins Ltd., another associate of Microcell Ltd. will also be opened on the same day.

●**France**—The 1967 World Fair will be held in Moscow, it was decided in Paris by the International Fair Bureau. Moscow got 16 votes and the only other candidate, Montreal, 14.

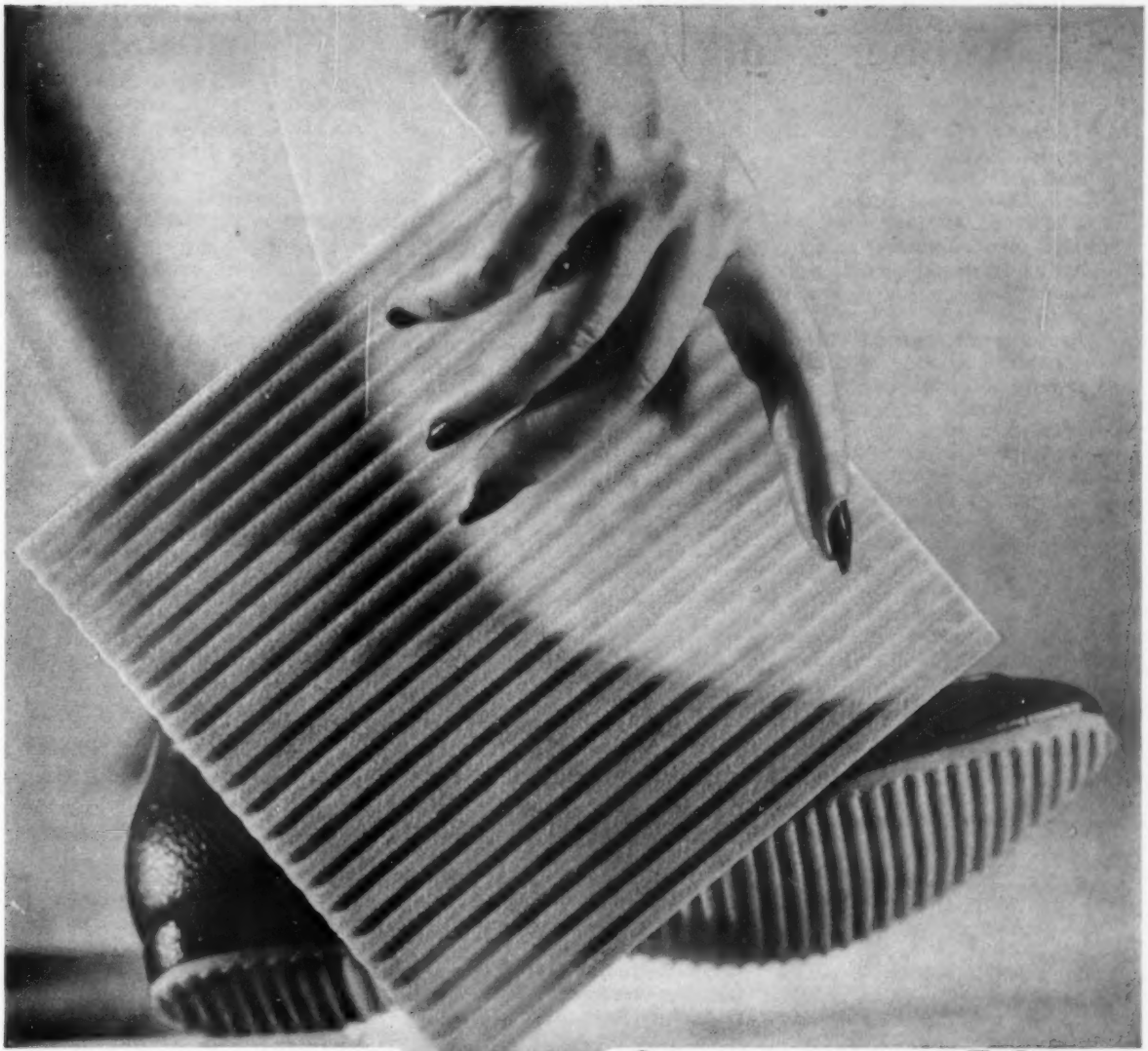
●**United Kingdom** — 'Terylene' reinforcement is being incorporated into the ½in. inside diameter neoprene hose used in the water cooling circuit for the magnet coils of the new Synchrotron 'Nimrod' at Harwell. The 7 Gev Proton Synchrotron is being built at the Rutherford High Energy Laboratory, Harwell, for the National Institute for Research in Nuclear Science. Castle Rubber Co. have produced the hose.

●**Tanganyika**—The Metal Box Co., of East Africa Ltd. has acquired all the shares of Plastics (Africa) Ltd., and the company's plant at Ruaraka will manufacture polythene film for the packaging industry, in addition to continuing the production of water pipes and various moulded products. The Metal Box Co. already has plants at Thika and Dar-es-Salaam. The company aims to set up an entirely self-supporting packaging industry in East Africa.

●**United Kingdom**—Vitafoam Ltd., of Manchester, opened their new London showroom on Tuesday. The company is now the largest latex foam manufacturer in Europe, with an output of 90,000 different latex foam units weekly.

●**United States**—Standard Oil, of New Jersey, has started producing polypropylene at its Baytown, Texas, plant. This new $30m. plant has an initial rated capacity of 40m. lb. a year.

'Let's face it Syd boy—with all the goodwill in the world, you ain't making nothing better for nobody'—484
(With apologies to the Dunlop Rubber Co. Ltd.)



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Rubber More or Less

ANY surplus of synthetic or natural rubber in 1960 will be needed to build up stocks, according to a communique issued by the International Rubber Study Group.

At the end of 1959, the communique says, commercial stocks of natural rubber in both producing and consuming countries had reached an unusually low level.

'A considerable part of whatever surplus there may be in 1960 would be required if commercial stocks in both producing and consuming countries are to be rebuilt to a more normal level. The rate of consumption of synthetic rubber continues to increase and the difference between production and consumption of synthetic rubber is likely to be no more than will be required to build up working stocks.'

The Study Group said that it estimated that 1960 world consumption would be 2,110,000 long tons of natural and some 1,750,000 long tons of synthetic, apart from synthetic produced in non-member countries. It estimated that world production of natural would be around 2,135,000 long tons, and production of synthetic in member countries around 1,810,000 long tons—total synthetic rubber production capacity in member countries is assessed at well above this: 2,335,000 long tons.

Stockpile Sales

The communique discusses the sales from government stockpiles by USA, UK and Italy, and comments that if the price of natural remains 'somewhat above the level' at which these governments have said they will sell unrestricted quantities of rubber, then substantial sales will continue to be made and may amount to a further 75,000 long tons for delivery during 1960.

The group estimates that UK consumption this year will be 270,000 tons, of which 100,000 tons will be synthetic, while USA is expected to use 1,655,000 tons of which 1,115,000 tons will be synthetic.

More Canadian Asbestos

A decision which could give Canada another producing mine is near. Pilot mill tests of the asbestos ore deposits on Advocate Mines' 750-square mile concession in Newfoundland are expected to be completed by July 1 when production plans can be made, president E. R. E. Carter told shareholders at the annual meeting.

He said production of 3,000 tons of ore daily is being contemplated, but a rate up to 5,000 tons daily is a possibility.

Development of Advocate's property has been under the supervision of Canadian Johns-Manville Co. which, in association with Patino of Canada, Amet Corporation Inc., Financière Belge l'Asbestos-Ciment, would finance the mine to production.

A market is to be guaranteed by three of the financing companies for 25,000 tons of asbestos annually for the first ten years of operation.

Mr Carter reported proved ore reserves at 21,000,000 tons, with a substantial additional tonnage indicated.

Cost of bringing the mine to production would be $17,900,000.

I.C.I. TO EXPAND PVC OUTPUT

I.C.I. is planning to expand PVC production by 10,000 tons. The expansion, which will take place at the Hillhouse, Lancashire, works of the company, where all I.C.I.'s PVC is produced, is expected to be complete by the middle of 1961.

This will bring the capacity at Hillhouse up to 80,000 tons. At the same time there will be a parallel extension in PVC compounding capacity, which is also expected to be completed by the middle of next year.

Reflecting Demand

This move reflects the increasing demand for PVC and follows the announcement made early last month by British Geon, who are also expanding PVC capacity. A £2m. extension is due to be completed at Barry by 1961 (*RJIP* April 2, 498).

Baker Perkins to Make German Machines

BAKER PERKINS LTD., have announced agreements with two German companies to manufacture and sell a complete range of rubber processing and moulding machinery now being made in Germany.

One of the German concerns, L. Herbert, of Frankfurt, is a specialist in tyre building and curing machinery, including bladder-type tyre curing presses for both new and re-tread work. A recent addition to its range is a new series of mechanically operated presses for general moulding.

The other company, Paul Troester, of Hanover, equally well known as plastics machinery manufacturers, supplies standard rubber processing equipment, including mills calenders and extruders.

The agreements will allow Baker Perkins, famous for many years for rubber industry mixing and material handling equipment, to offer a complete processing line to the UK and the Commonwealth.

Fablon 500 gauge polythene film, attached to special frames, is being placed over a Hayes hotel's 186 windows to protect the glass during exterior rendering.

Seven Rubber Companies Merge

A merger of seven rubber plantation companies, recommended by the respective Boards, is to be effected by an exchange of shares into a new holding company called London Sumatra Plantations.

The companies concerned are United Serdang (Sumatra) Rubber Plantations, Allied Sumatra Plantations, Lankat Rubber Co., Mendaris (Sumatra) Rubber and Produce Estates, Soengei Rampah Rubber and Coconut Plantations, Tandjong Rubber Co., Toerangie (Sumatra) Rubber and Produce Estates.

The share exchange terms (London Sumatra shares first) have been assessed as follows: Serdang (2 for 5); Allied (3 for 10); Lankat (1 for 2); Mendaris (1 for 5); Soengei (1 for 3); Tandjong (2 for 5); and Toerangie (9 for 10).

In addition to significant advantages of efficiency and economy in administering the estates, the merger will lead to a reduction of sterling expenditure. It will also reduce the total sum which must be retained by the Group in liquid form to finance current requirements and enable the Group to pursue a more consistent dividend policy than by the present companies individually.

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Plastics in Cables

PART 3: PVC—ITS COMPOUNDING AND HEAT RESISTANCE

(Continued from May 7 issue, page 686)

By W. S. PENN, B.Sc.

THE compounding of PVC polymers for cables follows the normal pattern. In other words, the compounds consist basically of polymer, plasticizer, lubricant and stabilizer. There are several developments of this basic mix, primarily with a view to obtaining economy, but also to give a number of specialized properties.

At the outset the difference between insulation and sheathing grades of PVC should be pointed out. The insulation types obviously require an electrical (suspension) type of polymer although the sheathing grades usually employ an emulsion type of polymer. It should be appreciated, however, that a very large proportion of insulation compound used in the cable industry is not used for its electrical properties at all but it is primarily used for the sheathing of large cables because of its greater toughness, since robustness is required in the sheath. It is possible, therefore, to design a special insulation compound for sheaths using emulsion type polymers and plasticizers, particularly secondary plasticizers, which are perhaps not best for electrical purposes, but the general practice is to use one principal insulation grade which can be used for all purposes.

Original Compounds

Table 1 gives a series of compounds used in the cable industry. Compound No. 1 is the basic type which was used for many years.

TABLE 1
PVC INSULATION COMPOUNDS
(Moulded 5 min. at 170°C.)

	1	2	3	4	5
Suspension polymer ..	100	100	100	100	100
Dinonyl phthalate	45	30	30	30	30
Cereclor 42	—	15	15	15	15
Whiting	—	—	15	15	15
Calcined clay	—	—	—	5	5
Dutrex 'R'	—	—	—	—	5
Calcium stearate	0.5	0.5	0.5	0.5	0.5
White lead	8	8	8	8	8
Tensile strength, psi ..	2,875	2,510	2,650	2,590	2,600
Modulus at 200%	2,450	2,240	2,420	2,370	2,390
Elongation at break, % ..	250	220	230	210	220
Hardness, B.S.	76	81	85	82	82
S.I.R., ohm/cm.	1×10^{13}	5×10^{13}	4×10^{13}	1×10^{14}	8×10^{13}

The plasticizer has been shown as DNP, but the preferences vary from company to company. DOP was popular for some time, but it has been replaced to a large extent by DIOP. The phosphates seem to have lost a considerable amount of popularity although it should be remembered that they are better than the phthalates from the point of view of stability to light.

There are many modern stabilizers and lubricants, but white lead is still very popular. The newer stabilizers based on tin, for example, would only be used for special purposes such as transparent types of insulation.

Developments in Compounding

Compound No. 1 although satisfactory in many ways is relatively expensive. It is now normal to use a secondary plasticizer of which there are many types but of which Cereclor 42 is very popular. Great care must be taken in the amount of plasticizer used or bleeding is likely to occur. In the case of Cereclor a maximum of one-third of the total plasticizer should be used. Small amounts of less compatible plasticizers may also be used such as certain petroleum products including various grades of Dutrex. It is interesting to note in comparing Compound No. 2 with Compound No. 1 that the use of a secondary plasticizer has increased the insulation resistance of the compound.

The biggest tendency today is to change from unfilled to filled PVC compounds. There is obviously a limit to the amount of filler which can be used, but it is surprising how much OMYA BSH can be added without affecting properties. Relatively small amounts of whiting can also be used for reasons of economy.

It is difficult to say what the limitation factors are in the use of fillers. However, certain features are obvious. In the first instance, the specific gravity increases rapidly with increasing filler content and since the compounds are sold on a volume basis there is a limiting content of filler which can be economically employed. This point is rarely reached, however, since the compound deteriorates in its processing properties. The surface becomes increasingly dull, the heat developed during extrusion is considerably increased so that the stability of the compound is endangered.

It appears that a reasonable filler for PVC compounding is calcined clay. A small amount of this has the property of boosting electricals slightly as can be seen from Compound No. 5.

All the above comments apply to insulation grades whether used for sheathing or electrical purposes. For pure sheathing grades much the same comments apply, although clearly more plasticizer will be used and probably a change will be made to the phosphate type of plasticizer.

Heat Resistance

The subject of heat resistance of PVC must be dealt with at some length since there is a great deal of confusion on the subject. When cablemakers give a figure for the operating temperature of any material they mean the continuous operating temperature up to a period of say 20 years. Thus the figure for natural rubber is 60°C., for butyl rubber 85°C. and for silicone rubber about 150°C. In the case of the PVC compounds given above the usual figure is 60-70°C.

It is possible to find claims in the literature for PVC which will operate up to 150°C. This certainly does not mean that it will operate continuously at this temperature because no PVC compound has yet been designed which will do this. At such temperatures the life of the compound is severely limited.

More usual claims are for PVC compounds operating at 105°C. and 85°C. Experience at the moment is limited but it is felt that for continuous operation it is best to confine any heat resisting PVC to 85°C. This is not to say that such materials cannot be operated for longish periods at

105°C. and the point is considered in some detail later.

Meaning of Heat Resistance

Another subject which causes considerable confusion is the meaning of the expression 'heat resistance.' This is normally taken to mean the ageing properties of the PVC compound at elevated temperatures. Some users in particular also take it to mean that the compounds do not become thermoplastic at the temperatures concerned, but this is not necessarily so.

Another conception in cable compounding for PVC is the hard type compound. This will use less plasticizer or a plasticizer of a different type. Thus hard grades resist deformation at elevated temperatures better than the softer grades, but they again are not necessarily heat resistant in the sense that they have better ageing properties at the elevated temperatures than the soft types. To get both resistance to hot deformation and good ageing properties at elevated temperatures it is necessary to have a hard heat resisting PVC. Such compounds do exist but they have been difficult to produce particularly in the insulation range.

Ageing Properties

First of all the effect of heat on standard PVC may be considered. Typical results are given in Tables 2 and 3. Some of the information is given diagrammatically in Figure 5.

At 120°C. it will be seen that the general purpose insulation deteriorates very rapidly indeed. The best criterion of this is the change in elongation which is given in Table 2. The mechanism of deterioration in this case is plasticizer loss, so that a constant reduction in elongation would be expected. This is precisely the result obtained and conversely tensile strength increases steadily.

Similar considerations apply to the general purpose sheaths although, since these start with a higher plasticizer content, they seem to retain their flexibility a little longer than the general purpose insulation.

The point about the resistance to heat and/or hot deformation is illustrated well by the elongation figures with the hard grade PVC. Although this has greater resistance to hot deformation than the general purpose insulation or sheath it deteriorates very rapidly. In fact, the elongation drops more rapidly than general purpose insulation which is a further illustration of the principle that the higher the initial plasticizer content the longer the material retains its flexibility.

The heat resisting type of compound must now be considered in the same way. Details of the changes undergone by this type of compound are also given in Tables 2 and 3 and Figure 5. In the case of elongation the reduction of this is very slow at 120°C. indeed although it is quite definite. After ten weeks' operation the material is still perfectly satisfactory and will continue so for a considerable period. However, it is obvious that such a compound will not have a twenty years' life.

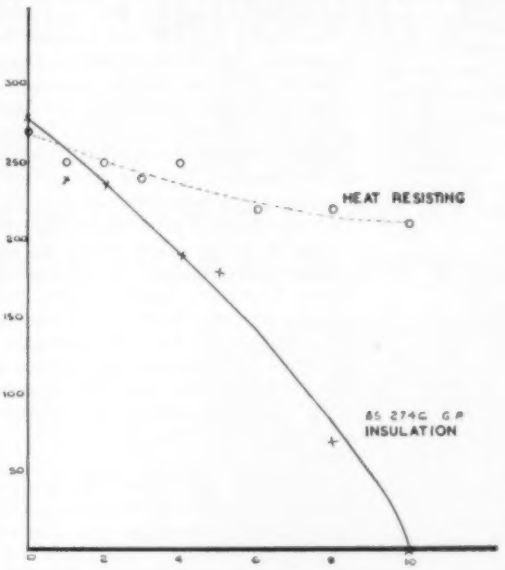

Fig. 5. Heat resistance of PVC at 120°C. Vertical axis—% elongation. Horizontal axis — time in weeks

The question of the composition of heat resisting mixes may be briefly considered. The compounds are normally similar to the standard types as far as lubricant and stabilizers are concerned, but for most compounds the monomeric plasticizer is replaced by a polymeric plasticizer of which a good example is Hexaplas PPA used to the extent of 40-50 parts. It is this type of compound which gives the results given in Tables 2 and 3. It may be noted in Table 3 that the tensile strength hardly increases at all, clearly because no plasticizer is lost.

A development is taking place in connexion with heat resisting compounds and the use of plasticizers therein. Until comparatively recently the only way of producing the heat resisting mix was to use a polymeric plasticizer. Experiments are now being carried out with the so-called

TABLE 2
HEAT RESISTANCE OF PVC
Elongation at Break

	120°C.				80°C.		
Weeks	G.P. Sheath	G.P. Insulation	Hard Grade	Heat Resisting	G.P. Insulation	Hard Grade	Heat Resisting
0	300	280	220	250	290	220	260
1	180	240	220	270			
2	170	235	215	250			
3	170	200	150	240			
4	150	190	50	250	260	180	260
6	150	180	10	220	240	180	250
8	100	70	7	220	230	190	270
10	20	0	0	210	220	170	270
12		—					
16		—					
20		—					

TABLE 3
HEAT RESISTANCE OF PVC
Tensile Strength

	120°C.				80°C.		
Weeks	G.P. Sheath	G.P. Insulation	Hard Grade	Heat Resisting	G.P. Insulation	Hard Grade	Heat Resisting
0	2,030	2,700	3,600	2,800	2,700	3,600	2,800
1	1,920	2,800	3,600	3,050			
2	1,840	2,860	3,700	3,030			
3	1,820	2,850	4,100	2,950			
4	1,980	3,000	5,800	2,960	3,100	3,500	2,700
6	2,250	2,950	7,000	3,000			
8	2,810	4,100	8,600	3,010	2,950	3,420	2,700
10	4,200	4,000	7,000	2,990			
12					3,000	3,440	2,600
16					2,900	3,400	2,600
20					3,100	3,410	2,550

high molecular weight monomeric plasticizers with which heat resisting grades can be made. There are some slight difficulties in extruding normal heat resisting mixes but these are largely overcome by the use of the new plasticizers. Moreover, it is now a comparatively simple matter to make a hard grade heat resisting PVC which was not easy with the polymeric plasticizers.

Tables 2 and 3 also give the properties of the various grades of PVC at 80°C. In the case of the general purpose insulation and the hard grade PVC the rate of deterioration of the elongation and increase of tensile strength is much less. The plastics will obviously have much longer lives at these lower temperatures. In the case of the heat resisting PVC there is virtually no detectable change in the elongation and the differences recorded can be accounted for by experimental error. This obviously means that there would be no difficulty in operating continuously this particular PVC at a temperature of 85°C.

Hot Deformation

Hot deformation may be defined as the percentage of deformation undergone by a specimen of PVC when subjected to a certain pressure at a certain temperature. In amendment No. 1 to BS 2746 the hot deformation test for the insulation consists essentially of applying a load of 1,000g. to a specimen 0.5in. in diameter and 0.05in. thick, placing the apparatus in an oven at 70°C. for 24 hours and measuring the deformation. Some typical results obtained together with the appropriate standard are given in Table 4.

TABLE 4
HOT DEFORMATION OF PVC (B.S. 2746)

Grade	Specification Value*	Typical Values 1	2	3
G.P. insulation	40	28	33	34
Hard grade insulation ..	30	19	21	17
G.P. sheath ..	55	43	50	47
Arctic sheath	65	56	55	60

* Maximum deformation %.

Looking at the specification values it will be seen that the hard grade insulation is to have the lowest deformation and the arctic sheath the highest, the other materials being intermediate values. There is no difficulty in meeting this specification.

It is felt in some quarters, particularly in other countries, that the British hot deformation test is not satisfactory. It is thought that the hot deformation should be carried out at temperatures above the normal operating temperature and this matter is being investigated at the present time. The most popular temperature to be considered is 120°C. for one hour (instead of 70°C. for 24 hours), but which weight will be applied is at the moment problematical. It is quite likely that a test of this nature will sooner or later be applied to various grades of PVC.

Applications

The use of heat resisting PVC is increasing although it does not form a large proportion of the total at the moment. One of the biggest applications is for floor heating where the cable is buried directly in the floor or pulled into conduit. PVC is particularly suitable for the former technique which is likely to become very popular and will probably be extended to road heating. It would perhaps be advisable to say a few words on the subject of floor and road heating. Some customers have thought that PVC is not really suitable here because it is likely to suffer from the defect of hot deformation. However, it should be stressed that floor heating only involves moderate temperatures for cables somewhere in the order of 70°C.

The other applications involve the use of PVC cables where the temperature is likely to be higher than normal. Much equipment in use today falls into this category and although PVC does not seem to be ideal for such applications it certainly has been used without difficulty.

In many cases where PVC is used, although it is not necessarily used at high temperatures in service, the ends of the cables frequently have to be potted in varnishes, bitumen, epoxy resins and the like. In some cases, stoving periods for an hour or so are necessary and PVC has to withstand such conditions. In most cases it is possible to use standard PVC for such purposes since the material will easily stand, say 120°C. for an hour or two, as can be seen from Table 2.

Processing

There is a tendency to modernize the PVC mixing side of the industry as obviously there should be. 'Dry mixing' has been tried in the past but this method is not generally considered suitable for cable insulation. Apart from anything else it is difficult to obtain a satisfactory finish. More important, of course, are the various mixer/extruders which are available and which are being used very successfully. The use of these methods will undoubtedly grow, although no doubt the capital expenditure involved will deter many firms.

It can be said with confidence, however, that at the present time the great majority of PVC used in the cable industry is made by the time honoured methods. That is to say, a pre-mix is made in a blender of the Gardner type, this requiring a cycle of about 20 minutes. After this the batch is discharged and loaded into a Banbury mixer or similar internal mixer where the white lead is added. A 5-minute cycle is quite common in the Banbury and the material is discharged at a temperature of 160°C.

After sheeting on a mill the PVC compound is transformed into a form suitable for direct addition to the hopper of an extruder. Until fairly recently the old type grinding equipment was used which was most unsatisfactory. It produced a sufficiently small size particle to handle but the trouble was that there was also considerable PVC dust. This tended to clog in the hopper of the machine and caused breakages in the extrudate. It is now preferable to use a dicing machine which produces a very free flowing cube-like material which is virtually dust free.

It is quite common today to use colourless masterbatches and to add colour masterbatches to them as desired. It should be stressed at once that this technique can only be employed with extruders having a screw with a high length/diameter ratio. If this is not the case the colour must be added in the Banbury. With those companies which can employ masterbatches there are several factors which must be taken into account in deciding whether or not to use the directly coloured material or the masterbatch technique. One important point is the question of storage space, where it is obviously more convenient to store a colourless masterbatch and make whatever colours are required. On the other hand, if considerable quantities of a particular colour are to be used, and this is often the case with red and black, then it is cheaper from the labour point of view to mix the colour in the Banbury. Otherwise, large quantities of masterbatch will have to be tumbled usually in comparatively small batches which is far from economical.

(To be continued)

Antioxidant for Whites

An additional rubber antioxidant has been added to the range available from Monsanto Chemicals Ltd.

Known as Antioxidant BHT, it is low-priced and non-staining, and Monsanto recommend it for white and pale coloured stocks. It is said to confer a high degree of resistance to oxidation and copper degradation and, at recommended levels, it is non-blooming. Being non-toxic, it can be used in contact with foodstuffs.

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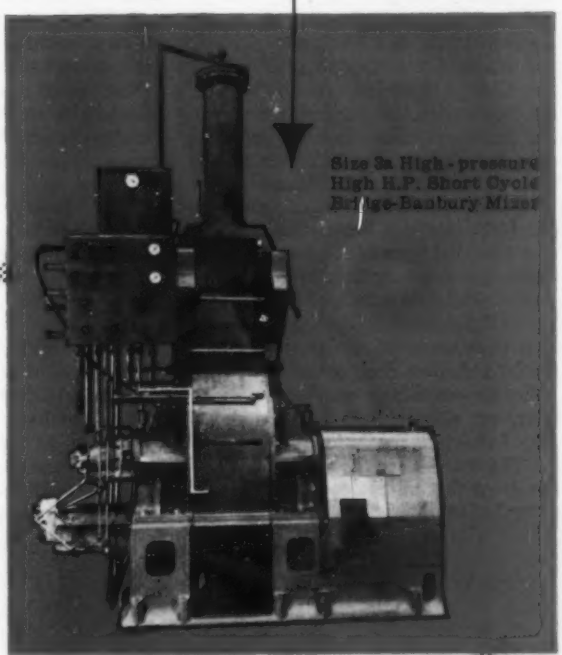

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Service Life of Rubbers

RABRM SYMPOSIUM

THE Research Association of British Rubber Manufacturers are indeed fortunate to have within easy reach of Shawbury such a delightful venue for their symposia as Attingham Park, one of the Stately Homes of England bequeathed to the National Trust by the late Lord Berwick and still in part occupied by his widow. The major part of the house is leased to the Governors of the Shropshire Adult College who hold residential educational and cultural courses there. The cultural education of the 50 or so who attended the symposium on The Service Life of Rubber last week was by no means neglected and, as a break from rubber, an illustrated lecture was given by Sir George Trevelyan Bt. the warden of Attingham, on his impressions of an American tour, and his assistant Mr R. Chaplin conducted a highly interesting tour of the house and a too short coach trip to places of interest in southern Shropshire, including Iron Bridge which takes its name from the first cast iron bridge in the world built across the Severn there in 1779, and which remains a staggering monument of engineering ability to its unknown designer and erectors, chief among whom was John Wilkinson, an almost legendary figure of the industrial revolution.

The response to the symposium was so great that all places were allocated long before the date and in order that those who were unable to be present may have the opportunity of hearing the papers delivered, it is proposed to hold a repeat session later in the year, probably in October, although according to Dr W. F. Watson, the Director of Research at RABRM, it is unlikely that many who have not already applied can be accommodated.

Requirements

The subjects discussed fell into three fairly distinct sections. Firstly the ageing and temperature requirements for rubber as used by the services, road, rail and air transport, followed by discussion on the various materials available to meet these requirements. Secondly the relationship between chemical structures and properties of rubbers and the scientific interpretation of ageing tests, and thirdly the developments in compounding methods used to improve ageing resistance. The last day was spent in a tour of the RABRM laboratories at Shawbury where the test equipment referred to during the discussions was demonstrated.

Dr Watson opened the symposium by welcoming and thanking everyone for coming and describing the arrangement of the lectures and discussions into the three broad sections already mentioned. The first five speakers, Messrs A. J. Aston, of Bristol Siddeley Engines Ltd.; A. E. Bray, of Morris Motors Ltd.; F. L. Collins, Ministry of Aviation; G. N. S. Farrand, Admirality; and W. Rhodes, of the British Transport Commission; all then spoke briefly on the ageing and temperature requirements for rubber in their various fields, and with slight variations all except Mr Rhodes detailed fairly similar requirements which were enormously wide including, resistance to temperatures ranging from −40°C. to 300°C., resistance to oils, ozone, 80% hydrogen peroxide, and other oxidizing agents, acids and bases, and service life up to five years. The railway's main needs were apparently an ability to withstand enormous compressive and shear loads and a service life of up to 12 years.

The rubber manufacturers were then given an opportunity to comment on these requirements and describe how far their own particular type of rubber compound could be expected to prove satisfactory. These speakers were Messrs J. T. Lewis, of Midland Silicones Ltd., who spoke about silicone rubbers; T. J. Sharp, British Geon Ltd., defending acrylates; A. G. Strong, Esso Petroleum Co. Ltd., butyls; and Dr J. J. Mausner, Du Pont (UK) Ltd., who described fluoroelastomers and chlorosulphonated polyethylenes available from his company.

Rubber Structure

Dr Watson then gave a lecture entitled 'Crosslinking and scission and the properties of rubber networks' in which he described the structure of rubber as being made up of long polymer chains which in the unstrained state adopt a large number of configurations due to rotation of these long molecules about single bonds, the probability being that the majority of the chains will be in a highly kinked state, thus allowing deformation of the rubber material by a straightening out of these kinked configurations. Elastic recovery on release of stress is due to the chains adopting a kinked configuration again. This concept of rubber structure gives a satisfactory explanation of rubber properties when considered in comparison with metal elasticity where deformation is accompanied by internal energy changes required to strain chemical bonds, whereas for rubbers elasticity is mainly the result of configurational entropy changes. Dr Watson went on to elaborate on this structural theory and explain by means of it the changes likely to occur during the service life of a rubber compound which could affect the ageing properties of the material.

Stress Relaxation

Dr J. Scanlan (RABRM) followed with a lecture entitled 'Scientific interpretation of ageing tests,' in which, using the concept described in the previous lecture, he established the information available from various methods of ageing test, dividing such tests into two groups depending on the objective in view as follows (i) To obtain indication of the behaviour of a compound in service by tests approximating to service conditions and (ii) To investigate the fundamental physical and chemical changes occurring during ageing.

His lecture was mainly devoted to one test method in the second category, namely stress relaxation measurement, which is based on the phenomenon of that name. If a strip of rubber is stretched and held at constant length the tension gradually decreases due to rearrangements in the polymer structure taking place, and by a measurement of this stress relaxation a direct measure of the molecular rearrangement is possible. The test is carried out in two distinct ways: either the specimen is continuously stretched, or as has been more recently suggested, the stretching to constant length and force measurement is carried out for short periods at intervals. This latter method is known as Intermittent Stress Relaxation. Mr K. R. Taylor, Monsanto Chemical Co. Ltd. bore out all that Dr. Scanlan had said about stress relaxation measurements, and said that very good correlation had been obtained between such

measurements and more normal ageing methods.

The second day of the symposium was opened with a lecture given by R. C. W. Moakes (RABRM) entitled 'The testing of rubbers for light and ozone resistance.' He described the difference in the effect produced on rubbers by exposure to light and ozone and detailed the available methods of producing an artificial light source approximating to global radiation. This was until fairly recently a carbon arc whose spectral distribution is very dissimilar to sunshine, and this is now being replaced by the use of a Xenon lamp which approximates closely in spectral distribution to global radiation. Experiments carried out at RABRM show remarkable similarity between the effects produced on samples exposed to a xenon lamp, and samples exposed outdoors, although heat cured natural rubbers show some differences not apparent with cold cured natural, SBR and butyls, and it was found that the temperature of the lamp was of great importance.

Mr Moakes also described the methods of ozone testing, the shortcomings of the established methods and the equipment being built at Shawbury to overcome these. The main difficulty is the control and measurement of the ozone concentration, and this will it is hoped be largely overcome in the new equipment.

Mr B. N. Leyland, of I.C.I. Ltd., followed with a description of apparatus being developed for ozone testing capable of producing conditions similar to those of the RABRM equipment, the basic difference being the method of controlling the ozone concentration, the I.C.I. machine producing a very high concentration and diluting to the required strength, while the RABRM method varies the rate of production of ozone as required.

Compounding

Dr J. T. Watts, also of I.C.I. Ltd., then read a paper on 'Chemical additives and ageing,' his talk being subdivided into six sections, each dealing with the additives used to check degradation caused by the following processes: (1) Shelf ageing; (2) oxidation aided by metallic catalysts; (3) heat; (4) light; (5) flex-cracking; and (6) atmospheric cracking.

Three lectures were then given by Messrs M. W. Philpott (BRPRA), S. G. Fogg (BRPRA), and J. R. Pyne (RABRM) on the developments in improved ageing resistance which have been achieved by compounding techniques in latex compounds, natural rubber, and synthetic rubber respectively.

Following Mr Philpott's lecture, two more rubber manufacturers had an opportunity to describe particular products, and Mr A. Fiber, of Du Pont (United Kingdom) Ltd., compared the ageing properties of neoprene latex films with natural, and Mr K. Pickard, of Polymer (United Kingdom) Ltd., spoke on SBR, which he placed above natural rubber, but below nitrile, neoprene or butyl as far as ageing properties are concerned.

The last morning was occupied by a most interesting tour of the RABRM laboratories at Shawbury, during which participants had an opportunity of seeing, among other things, the apparatus which had been described during the lectures. The party then broke up after an excellent lunch in the canteen.

It will be agreed by all who attended this symposium that it was most efficiently organized and very much worthwhile, and that thanks and congratulations are due to all the RABRM staff who made it possible, and also to all who contributed to the lectures and discussions.

1962 Conference

At a meeting of the IRI Council on April 26 it was decided that the title of the 1962 conference should be 'Fourth Rubber Technology Conference, 1962.'

T. H. Messenger was admitted to the Fellowship; G. P. R. Bielstein and R. J. Ceresa to the Associateship. G. J. Thomas and Paul Van Cleef were elected to long service membership.

NEW OFFICIALS

Annual general meetings of various rubber manufacturing associations have been held. The British Mechanical Rubber Manufacturers' Association have elected as chairman W. E. Prior (Northern Rubber Co. Ltd.) and vice-chairman J. W. Mann (Joseph Lucas (Electrical) Ltd.). The British Wrapped Rubber Hose Manufacturers' Association's new chairman is H. H. H. Helby (North British Rubber Co. Ltd.), vice-chairman is D. P. G. Moseley (D. Moseley and Sons Ltd.). David Marshall (Greengate and Irwell) has been re-elected chairman of the British Rubber and Plastics Belting Manufacturers' Association. A. W. Hopkins (General Electric) has been re-elected chairman of the Association of British Ebonite Manufacturers. The British Rubber Hot Water Bottle Manufacturers' Association's new chairman is A. E. Hancock (J. G. Ingram) and the British Latex Foam Manufacturers' Association's new officers are: chairman, N. Grimshaw (Vitafoam) and vice-chairman, H. A. Howard (Hairlok Co.).

The British Rubber Flooring Manufacturers' Association elected B. M. Fawkes (Rubberware) chairman, and T. Thirley (Runnymede Rubber) vice-chairman. The British Cellular Rubber and Plastics Manufacturers' Association's new chairman is A. Wrigley (Sorbo); vice-chairman is J. H. Webb (Kay Bros. Plastics). D. J. Scott (St. Albans Rubber) is chairman of the cellular rubber section, and G. F. Carr (Dunlop) is chairman of the plastic foam section.

When members of the Rubber Traders' Association visited Fort Dunlop recently great interest was shown in tyre manufacturing processes. Mr H. Williams, of Fort Dunlop, demonstrates a point to Mr L. Hedley-Prole, of P. & O. Steam Navigation Co., and Mr V. P. C. Wells of the Rubber Traders' Association

Plastics in USSR

RUSSIAN SCIENTIST SPEAKS TO PI LONDON SECTION

THE meeting of the London Section Plastics Institute held on May 3 rounded off a very successful session of lectures with something of a climax. It was probably the first time that a Russian worker has come to report some of his activities to an English Institute, which is not of a strictly academic character. At any

DR M. S. AKUTIN

rate, it is certain that the London Section was blazing a trail in the Plastics Institute, in inviting and receiving a guest from an official Soviet body active in this field.

Dr M. S. Akutin is the director of the Moscow Plastics Institute, a research organization which is carrying out work of academic interest but which is primarily concerned with the development of materials. As such they have been interested, among other things in the possibilities of block and graft copolymerization, since these techniques hold out the promise of the production of new polymers with interesting and desirable properties. Dr Akutin chose this as the subject of his lecture and gave his audience a very 'meaty' review of the work the Russians have been doing.

Block and graft copolymers are polymers consisting of more than one basic monomer unit, with the components organized in characteristic ways in long chain molecules. To be more explicit, polyvinyl chloride molecules, for example, are long chains, all the links of which consist of monomeric vinyl chloride units, a vinyl chloride-vinyl acetate copolymer chain is made up of both these units more or less randomly arranged. A graft copolymer of these two substances would say consist of a main chain of vinyl chloride units with branches of vinyl acetate units, rather like the trunk of a tree with branches coming off at intervals. A block copolymer would present a chain which is built up of alternating blocks of several units of vinyl chloride and vinyl acetate. This is a very 'potted' explanation of a quite complex subject.

Dr Akutin spoke of the various methods which the Russians have been using to produce these materials. He referred to the available chemical methods, which are quite well known and mentioned products which are not so familiar. For example he described a block copolymer of phenolic and epoxy resins and some of the properties of a glass-fibre laminate made from it. He claimed that it retained a high proportion of its original mechanical strength even at temperatures between 300-400°C.

Graft copolymers, made chemically, include a range of common monomers paired with starch, polystyrene-acrylic acid and interestingly, isotactic polystyrene and styrene. They have also made graft products based on fluorine polymers and methyl methacrylate. It is important to note however that the fluorine compounds are not fully fluorinated but rather of the C_2F_3H and $C_2F_2H_2$ varieties, which are soluble in methyl methacrylate. Incidentally their trade names for these fluorine polymers are 'floroplast H' and 'floroplast 32.'

Dr Akutin went on to speak of the mechanico-chemical means that have been used. He acknowledged the work of Pike and Watson, among others, in this field and then described what he called 'a new and interesting field of research,' *viz.*, the formation of graft copolymerization on freshly formed surfaces. Such surfaces may be provided by inorganic 'fillers' which have been activated by intensive mechanical destruction, preferably in an inert atmosphere. He quoted a material, which the Russians called 'Decorrosite,' as an example of this sort of graft copolymer. It consists of a phenolic resin and PVC grafted on coke. 'Decorrosite' is now in production and is used in situations demanding high heat and satisfactory water and chemical resistance.

Mechanical Method

To make graft-block copolymers (*i.e.* copolymers exhibiting both forms) by mechanical abrasion, the Russians have developed their own modifications of a masticator. With them they have produced a number of copolymers including epoxy resin-nitrile rubber, phenol resin-nitrile rubber, coal tar pitch-nitrile rubber, and polystyrene-methyl methacrylate. A study of their properties led to the conclusion that they are in fact, the resultant of their component polymers.

The mechanical method for making block-graft copolymers provides, in principle, a good versatile and flexible technique, but in practice produces mixtures of homopolymers and copolymers, from which the latter should be isolated. Further, the polymer may be unintentionally modified by the grafting of abraded material.

Dr Akutin's laboratories have also done some work on block and graft copolymers utilizing ultra-sonic radiations on fluor-polymers or polysiloxane and polymethyl methacrylate, ethyl cellulose PVC, etc., as the second component. He described and illustrated the apparatus in which

At the annual general meeting of the Plastics Institute, London Section, the President of the Institute, Mr Harold Wilson, presented certificates (*RJIP*, May 7, 698). Here he congratulates (*left*) G. Jablonsky (Jablo Propellors Ltd.) and A. Lewin (Fibreform Ltd.), who were both elected Fellows

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it was done and showed that while the yield of copolymers was low (about 7%) their mechanical strength was superior to the corresponding homopolymer mixture.

The use of a spark discharge in a liquid is yet another technique which they have brought out of their armoury in their attack on this problem of making block-graft copolymers. As a result of pressure generated within the system, by regular repeated spark discharge, rupture of the polymeric molecules in solution takes place with the emergence of free macroradicals. The liquid may be the monomer acting as solvent or another foreign solvent. Copolymers produced in this way have been based on fluor-containing polymers and polymethyl methacrylate as well as PVC and polymethyl methacrylate and PVC and methyl methacrylate. Once again however the isolation of the copolymers involves a tiresome fractionation.

Spark Discharge Better

In evaluating the different mechano-chemical methods of producing copolymers, he thought that for practical purposes the ultra-sonic method was not effective, since the yield per unit of energy is so small (20kwh/kg). The spark discharge is better in this respect (5kwh/kg) and can probably be improved quite a lot. Further the polymer yield is between 60 and 80%. But both these techniques are limited by the necessity for reaction in solution which reduces the possible combination of polymers and reduces also the concentration of the reactants.

Mechanical grinding does not suffer these limitations and the yield of copolymer is about 20-25%. The snags here arise from the abrasion of the metal and in the opinion of Dr Akutin, its future depends on the design of an efficient apparatus.

In a short review of the properties of block and graft copolymers, the speaker pointed out that in general their glass and flow temperatures tended to be displaced upwards as compared with homopolymer mixtures. As a rule the interval between these two temperatures was increased. He also commented on the interesting and oft-described surface active characteristics of copolymers made from water and oil soluble polymers. On the whole Dr Akutin was somewhat troubled by the paucity of available data on properties.

All in all, this was a most interesting evening. The paper was very well received and judging by the friendly manifestations of goodwill all round we may hope for more of this sort of contact. It will no doubt be to everyones' advantage. M.K.

Dow in Frankfurt and Milan

Dow International announce that two of its European subsidiaries have opened new offices at Frankfurt and Milan.

The marketing office in Frankfurt of Deutsche Dow Chemie GmbH will handle the marketing of Dow chemicals, plastics and other products in Germany, Austria and Switzerland. Address is Weissfrauenstrasse 3.

The Milan office of Dow Chimica Italiana S.p.A., the newly-formed Italian subsidiary, will handle the marketing of Dow products in Italy, Greece and the Near East countries. Address is Via Larga 31. Dow recently announced that it will construct a polystyrene plant in the Leghorn area.

IRI Manchester Golf

The Manchester Section, in rather gloomy weather held their qualifying round for the Wallwork Cup on April 25, at Ringway Golf Club. Despite the weather, there was a good turn out, some 45 members taking part in the afternoon's play. This gives the Manchester section 15 qualifiers, plus the vice-president and the captain of the section—a total of 17 in all to take part in the Wallwork Cup week-end.

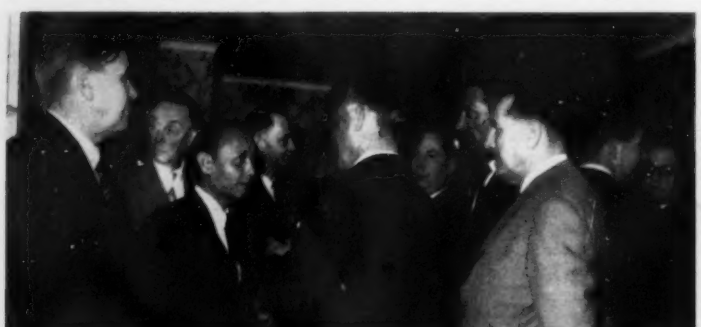
The standard was fairly high, and some good scores were returned. The winner was W. A. Kenyon, with a net score of 71, having played off a handicap of 19. He was followed by Mr B. J. Haill with a net score of 72, off a handicap of 18.

At the dinner afterwards, S. Heywood, the new captain of the section, welcomed all the members to the first match of the season, and hoped that the excellent turn out would be repeated throughout the year.

Afterwards he distributed prizes to W. A. Kenyon (71), B. J. Haill (72), J. N. Dexter (73), A. Lord (74), J. Hepworth (74), J. L. Ferguson (75), J. Halstead (76), S. K. Roberts (77), R. N. Ferguson (77), and A. W. Ayres (77).

Prizes were donated by the following firms: Travis Industries, Alfred Smith, British Geon, Dunlop, I.C.I., British Recovered Rubber, West and Senior, Greengate and Irwell, Rubber Regenerating Co.

A new direct vulcanized microcellular soling compound, made by B.B. Chemical Co., was shown at the Leicester Shoe Trades Fair. It is described as waterproof, with a tough, solid skin on exterior surfaces, giving good wearing properties.



Among those present at the Natural Rubber Symposium organized by the Internationales Kautschukburo Deutschland and held in Frankfurt (*RJIP*, May 7 1960) were (*left to right*) Dr M. Francis (British Embassy, Bonn), F. C. Butler (British Consultate, Frankfurt), Dr N. Oemarjadi (Indonesian commercial attache, Bonn), Dr D. Schmidt (W.d.K.), L. J. W. Bailey (Dunlop Hanau), Dr G. Fromandi (Farbenfabriken Bayer, president, Deutsche Kautschuk Gesellshaft), W. Kraemer (Dunlop Hanau), Dr W. Stegemann (Phoenix Gummiwerke), Dr J. I. Cunneen (BRPRA), M. Kettel (Frankfurt/Main), Dr L. Bateman (director, BRPRA), R. Jeannel (French consul-general), Dr Leiske (Burgermeister of Frankfurt) and Dr H. M. Bohm (IKD)

VIEWS *and* REVIEWS

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **Dr Schidrowitz**

Du Pont's Many Activities

THE activities of Du Pont may be gauged to some extent by a catalogue or contents sheet of its *Magazine*, but a few words may be better and this is especially so of the March and April issue, if we bear in mind the picturesque language compared with our sober version. We begin with:

Packaging Progress

'Last month' the packaging progress is thus introduced: 'in the executive business of perhaps 10,000 business firms all across the nation, huddles were under way between top management and a special group of salesmen representing Du Pont customers. Priority agents on the agendas. What could or should be done through package design, to up-to-date the look of consumer products made by these firms: makers of food, tobacco, textile and other products.

The enterprising visitors, loaded with better ideals on better packages were known as flexible packaging suppliers or film converters. They ranged from 10-man outfits ranging from $250,000 in packaging materials on each year to 2,000-man firms selling $40m. or more So successful have they been that last year their industry has produced $500m. worth of packages. . . .'

The essential role of the film converter who is so successful in blending individual skills to produce protective, productive, and appealing packages was summarized recently by John M. Cowan, managing director of the National Flexible Packaging Association, a 10-year-old trade association. 'An inept package is a major handicap to sales, but a package with the right appeal brings sales volumes to the manufacturer—plus a real measure of convenience and service to the consumer. The film converter provides tremendous leverage towards business success through his development of ever-better packages.'

'But no one in this field,' observes Cowan, 'owns a market or a customer. New materials, techniques or machinery are always turning up in packaging with resulting shifts and changing to competitive ideas and methods, it's only through the partnership of large suppliers such as Du Pont, and the ever important converters that US business can meet the increasing challenges in marketing their products.'

It seems to me a good idea to bring together the makers of cellophane, polythene, acetate, and 'Mylar' and their users.

If I have reviewed the above at length, I think that it is especially important: I fear that I shall not be able to allocate as much space as I might have desired to other matters, including the one referred to as 'America at work; Pioneering an important Fibre,' namely 'Lycra' fibre, Du Pont's 'newest synthetic fibre, a new fibre that stretches and swings back into place like rubber.'

The fibre that 'Betty' was demonstrating is still only in limited laboratory scale production, 'but already observers are anticipating that it may bring about a change in the women's foundation garment industry as *nylon* did in hosiery. "Lycra" is stronger and more durable than conventional elastic thread; it gives longer wear and has from two to three times the restraining power as the same weight of conventional fabric.

'Manufacturers of girdles who have been evaluating the properties of the fibre for the past several years agree that it provides softer, lighter and sheerer garments with the same kind of figure control heretofore confined to heavier bulky garments.' It can be safely machine washed and machine dried under the proper conditions, is dyeable, and is highly resistant to perspiration and cosmetics.

Already field research by the foundation garment industry, on top of a $10m. research and development programme by Du Pont has confirmed the 'unusual' promise of this new fibre.

Here are a few of the physical characteristics of 'Lycra':

Deniers	70, 140, 280, 420, 560
Break tenacity, gpd	0.6—0.8
Break Elongation %	520 to 610
Power at 50% Elongation gpd	0.03 to 0.04
Power at 200% Elongation gpd	0.10 to 0.12
Stress Decay 1min. at 50% Elongation	6—8%
Tensile recovery from 50% Elongation	93.5—96%
Moisture regain at 70°F., 65% RH	0.3%

'Lycra' will remain in limited supply until the full plant facilities are in production in 1961. I have only given—perforce—a small part of the 'Lycra' matter on this occasion, and it is to be noted that 'Lycra' requires vastly more complex chemical reaction than any of Du Pont's six other synthetic fibres . . . ultimate benefits to customers, however, offer the prospect of substantial new business opportunities that will be generated as this product is pulled from the laboratory to pilot plant and beyond.

Tooling

Amongst other headlines that draw attention are 'Tooling Plants gear lines to improved processes.' Phosphatizing is old hat to metals men—but phosphate coatings applied in a new way (via Du Pont trichlorethylene solvents instead of the water solutions) would eliminate some 50ft. of conveyor line needed for drying . . .

And so it goes on: 'New job for Neoprene, simplifying assembly and improve performance.'

'In 10 years, nylon has surged to a place of eminence in a car's interior; three out of four cars wear upholstery of Du Pont nylon . . . .'

Note

Anent my remarks on rubber sponges in recent reviews, I am glad to hear from the Editor of *RJIP* that the St. Albans Rubber Co. Ltd. continue to supply substantial quantities of rubber sponges to the country's largest retail chemists. In his letter, Mr D. J. Scott, said that the company also sells to many export markets. He said that at St. Albans their opinion is that rubber sponge has a much greater life than one of foam for both toilet and commercial use.

PHILIP SCHIDROWITZ

MEN *and* MATTERS

A Review of People and Events

by George A. Greenwood

THERE is a word to be said about the 500th edition of the magazine *Co-partnership*, the official organ of the Industrial Co-Partnership Association, founded so long ago as 1884. It has a lot of companies and business organizations associated with rubber and plastics in its midst, and many of the directors of these undertakings are prominent in its work. They include, as some of you already know, such men as Sir Alexander Fleck, K.B.E., F.R.S., who sends a special message to this noteworthy issue, Mr A. I. Baker, C.B.E., M.A., of Baker Perkins and other associated companies, Mr F. J. Holroyde, Sir Wilfrid Garrett, K.B.E., and many more.

In general, the adoption and application of the principles of profit sharing and co-partnership have a very definite influence in the keeping of industrial peace, but as will have been seen, there has been an exception in the case of some employees of I.C.I. Its new chairman, Mr F. P. Chambers, in a message to the I.C.I. works newspaper at Wilton, near Middlesbrough, drops the hint that the combine might have to consider excluding unofficial strikers from its profit-sharing scheme.

This would certainly seem logical when it is remembered that a stoppage like that at Wilton a couple of months ago at one stage threatened to shut the factories. In any case, it involved about 1,000 members of the AEU and a lot of workers who had neither part or lot in the affair, were themselves deprived of doing their jobs, earning their wages, and adding to the company's profits, in which they in turn share so handsomely.

Next comes a brochure, 'Getting Together,' issued by Sutcliffe Engineering Industries Ltd., who, as everybody knows, are such big rubber users in their factories in the south-west corner of Yorkshire. Things have changed a lot since I first knew, not long after the opening of the century, about what goes on at the Universal works at Horbury, near Wakefield, and now for the past 13 or 14 years at the Impact works of the Sutcliffe Moulded Rubber Co. Ltd. at Ossett, but those who are already more or less aware of the size and scope of the combine will, I should imagine, be particularly interested first in the personal link which has so wonderfully survived the growth of the business, and the way in which the various operating companies and group services are integrated.

At a reception held after the official launching of Dow Chemical (UK) Ltd., are *(right)* **Sir John Dean, president of the IRI, and G. L. Bailey, president of the Institute of Metals. They are talking to E. K. Stilbert, a vice-president of Dow Chemical International S.A.** *(left)*

Quite Personal

In his statement, circulated with the report and accounts of George Angus and Co. Ltd. preceding its annual meeting at Newcastle, Colonel E. Graham Angus, C.B.E., was able not only to indicate that the group surplus before taxation had more than doubled in 1959 over the previous twelve months, but also to reveal a nice gesture on the part of his colleagues on the board. They told him that they wished to mark his 25 years' service as a managing director by establishing a 'Graham Angus Travel Scholarship' to be made available annually to the applicant—from any division of the group, considered most likely to benefit from a period of foreign travel.

'The details are settled by a small committee of the board, presided over by Sir Walter Drummond,' added Colonel Angus, 'and I am very grateful to him for the time he devoted to the matter, and to all my colleagues for supporting the project.'

From Goodyear I have news that Mr D. G. Julien has joined the company's advertising department at Wolverhampton to take over the responsibilities for the General Products Division advertising. A native of Oldham, Mr Julien has had an extensive and varied career in advertising and publicity, ranging from photographic journalism in Stockport to assistant publicity manager for The Nuclear Power Plant Co. Ltd. of Knutsford, which is the position he held before taking up his new post. The General Products Division is a rapidly expanding section of the Goodyear business, with a number of exciting new materials coming into the line during the next twelve months.

From Kuala Lumpur comes the news which will interest many people in rubber all over the world that at the inaugural meeting of the Rubber Association of Singapore and Malaya, held at Singapore, Tan Lark Sye was elected first chairman, and Mr E. G. Holiday deputy chairman. This is the first occasion, I am told, for a Chinese ever to hold office in a com-

What makes a chairman cheerful?...

In this case the thought that the solvent recovery unit installed a year or two ago has already covered its cost and is paying dividends. This plant adsorbs by active carbon valuable solvents previously lost by evaporation, and returns them for re-use over and over again. Substantial savings —cheerful chairman.

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bined Malayan rubber trade organization.

Top Designer

Ecko Plastics have always placed great emphasis on design, and now a Horners' award winner, Mr D. Harman Powell, M.S.I.A., F.R.S.A., has been appointed head of their design studio. Educated at Southend School of Art where he won a Royal Society of Arts £150 bursary for the design of domestic electrical appliances, Mr Powell joined the industrial design studio of E. K. Cole in 1951. In 1953 he moved to the group product design unit of British Industrial Plastics Ltd., where he won the Horners' Award in 1957 for his all-plastics greenhouse—claimed to be the world's first. Other notable designs from him include a range of modern melamine domestic ware.

D. H. POWELL

Plastics Chopstics

A publication reaches this country every month from Japan entitled 'Plastics Industry News Japan.' Apart from a few places where an inky-footed spider has been let loose the whole publication is in English in so far as such things as manufacturers' names can be translated, and even here extra details are given. For instance 'Shin Nippon Chisso Hiryo K.K., as no doubt our more erudite readers are aware, is New Japan Nitrogenous Fertilizer Co. Ltd.

The journal is in fact a review of the petrochemical and plastics industries and does contain a great deal of information, which is extremely interesting to read because in practically every paragraph some quaint but usually very pertinent remark appears, which makes it quite obvious that the journal is not seen by English-speaking eyes (if a lapse into Japanese English may be forgiven!) prior to publication. Referring to polypropylene the following remark appears 'But the main feature of the new olefin resin has a tendency of low pressure polyethylene. This is the point of headache. . . .' Another point of interest to manufacturers looking for new markets is 'Chopsticks, cups, bowl, sugar holder, butter case are now becoming to be made largely of plastics. . . .' However, joking apart, this is a most noteworthy and ambitious project, and if one considers the pitfalls into which we would undoubtedly slip if attempting the same thing in reverse, it is extremely well done.

Spa Plastics Man to Holland

'We are grateful to Royal Dutch Shell for this opportunity to keep us up to date in this branch of technology' stated Mr David A. Freeman, managing director of Spa Brushes Ltd., when Mr Tom Freeborn, of Spa Plastics left Chesham last week for Holland. He is one of the first few British plastics technologists to attend a course, organized by the Royal Dutch Shell Co. at Delft, on polypropylene. Mr Freeborn lives at Chesham and has been in the service of Spa Brushes for three years. As a matter of additional interest, Spa Brushes are already using polypropylene in the manufacture of the backs of their new surgeons' nail brushes, where its ability to withstand repeated sterilization is of great value.

* * *

Mr John F. Carter, who was at one time a director and secretary of the famous Bradford textile concern of Lister and Co. Ltd., has been appointed Yorkshire area sales manager of Chemstrand Co. Ltd. He joins the latter concern from Processed Fibres Ltd., where he was general assistant to the managing director. He has worked in the West Riding of Yorkshire all his business life, and still lives at Calverley, near Bradford.

* * *

Miss Noreen Paterson, 19-year-old laboratory assistant at North British Rubber's Heathhall, Dumfries, factory, has been elected cornet's lass for the Dumfries 'Guid Nychburris' Festival, which takes place in June.

Question Corner—117

(Second Series)

442. What consideration should be given in designing a mould, with special reference to the cavity?

(Answer next week)

Answer to Question Corner—116

441. There are three devices which are necessary when coating wire for electrical applications: a spark tester, diameter gauge and an eccentricity gauge.

The spark tester checks the coated wire for breaks in insulation and may consist of a tunnel several feet long which serves as an electrode, through which the insulated wire passes. It is located between the cooling trough and the wind-up. The cable brushes against a large number of chains hung from the tunnel roof to which a high voltage is applied. The coated wire is grounded so that any fault in the insulation will discharge the high voltage to the ground. Each discharge operates a visible or audible warning device.

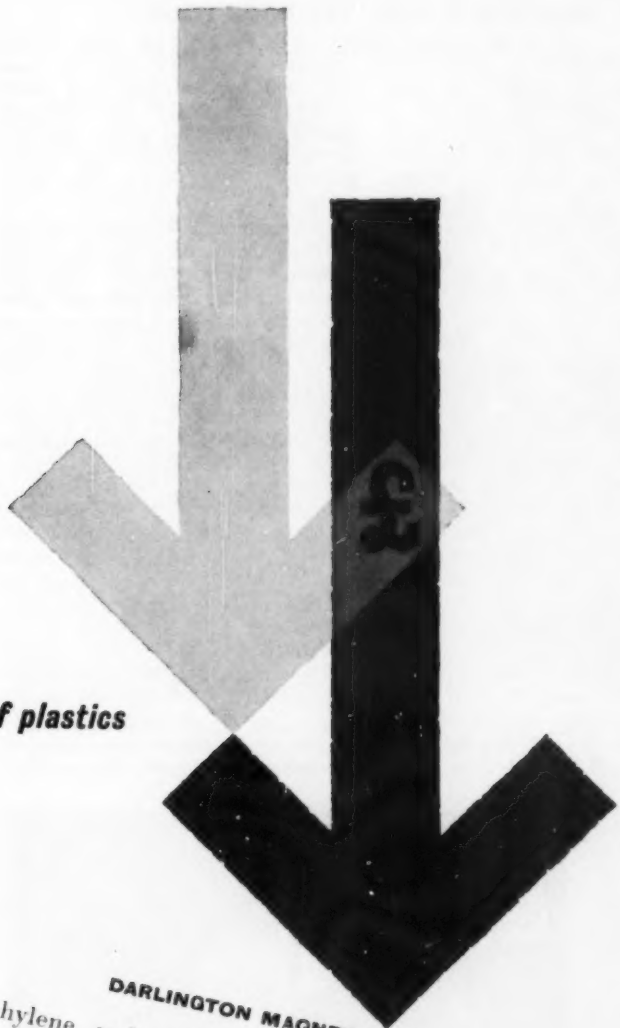
The diameter of the coated wire should be controlled within close limits, particularly when for high-frequency use. This is done by diameter gauges which measure the outer diameter at short intervals. When the gauge indicates a change in diameter the capstan wind-up speed is adjusted automatically, by means of a servo mechanism, or by hand. Diameter gauges measure the outside diameter either by optical or mechanical means.

Many cables, especially for radio and television relays, must have accurate centralization of the wire inside the coating. Many dies have fixed guides which ensure accurate centralization, but guide adjustment is not easy and, also, the adjustment may be disturbed during the run. To safeguard against this an eccentricity gauge may be part of the equipment and is either based on electromagnetic principles, or uses x-rays for direct checking of the position of the wire inside the sheathing.

(Another question next week)

Polly Ester Says . . .

'Dry cycling—pub crawl outside licensing hours'



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I.C.I. in Russia

PLASTICS IN INDUSTRY EXHIBITION

THE Plastics Division of I.C.I. is including a number of large items in the exhibitions which it is organizing in Moscow (June 3-17) and Leningrad (July 15-29) this summer. These include an 'Alkathene' boat made by the Engel process; an Austin Seven Saloon car illustrating the use of I.C.I. plastics in the motor industry; a section of a bathroom showing 'Perspex' sanitary ware and PVC flooring; a section of a kitchen with a 'Perspex' sink, 'Perspex' drainer and PVC flooring; samples of rigid PVC tubing and conveyor belting for foodstuffs and mines. There will also be a wide range of samples mounted in display cases. A 4-page newspaper describing the exhibition and listing the customers who supplied the exhibits will be available, together with a new brochure about Plastics Division's products.

In Moscow, R. H. Windsor Ltd., machinery manufacturers of Chessington, Surrey, are to demonstrate an A.P. 1044 pre-plasticizing twin screw injection moulding machine with a capacity of 26oz. (735g.). They will also have an R.C. 100 twin screw extruder suitable for handling rigid PVC with a rated capacity of 100lb. (45kg.) per hour. The moulding machine will produce an oval washing-up bowl in 'Alkathene' and the extruder 4in. (10.16cm.) rigid PVC tubing.

In Leningrad a W.10 2oz. (56.7g.) injection moulding machine and 114mm. single screw induction heated extruder with hydraulic drive will be used. A small domestic article will be turned out on the injection moulding machine, while on the extruder 3in. (77mm.) o.d. polythene tubing 0.0975in. (2.5mm.) wall thickness for lining steel tubing will be produced.

Receptions are being held in Moscow and Leningrad immediately after the opening of the exhibitions. The British Ambassador, who is to open the Moscow and Leningrad exhibitions, will also attend the receptions.

Mario Armengol, the Spanish designer, has designed the display stands, which are being built by the City Display Organization. City Display will erect these in both Moscow and Leningrad. Dexion Ltd., the sub-contractors, are to erect the PVC film shelter which will house the injection moulding machine and extruder in Moscow. A Soviet ship, 'Angarfk,' will carry the display to Leningrad at the beginning of May.

The Moscow exhibition is being held in the Polytechnic Museum. It will cover 3,230 sq. ft. (300m².) in the actual building and 1,075 sq. ft. (100m².) in the courtyard. In Leningrad, the exhibition takes place in the Exposition Pavilion in the Park of Kirov, ten miles from the city centre.

Lectures

A series of lectures will be given daily during the course of both exhibitions. In Moscow, the introductory talk will be given by Mr Maldwyn Jones development director, Plastics Division, and in Leningrad by Mr A. Renfrew, overseas director of the Plastics Division. It is hoped to arrange for simultaneous translations to be made and, in any case, all the lectures will be translated into Russian and copies will be available at the lectures.

Lectures include: 'Injection Moulding of Alkathene,' by Mr C. D. Dunkley. 'The Shaping of Thermoplastics with Reference to Domestic Application,' by Mr P. H. Collins. 'The "Butakon" Range of Nitrile Rubbers and Butadiene Copolymer Latices,' by Mr C. L. Bryant. 'The Fabrication of Thermoplastic Sheet with Reference to Industrial Applications.' 'Polythene Film, Applications and Production,' by Mr S. J. Barker. 'Alkathene and Rigid PVC Tube, Extrusion and Applications,' by Mr W. L. Thorne. There will also be several film shows daily.

The finishing touches being put to the stand of I.C.I. Plastics Division at the City Display Organisation, Shepherds Bush, London, W.12, before it is shipped to the Soviet Union for erection in Moscow in June. This is the first time a foreign plastics exhibition has been held in the Soviet Union. In the foreground of the picture are *(left)* **Mario Armengol, the designer of the stand,** *(centre)* **P. I. Smith, Publicity Manager, I.C.I. Plastics Division, and** *(right)* **D. G. Owen, Sales Director, I.C.I. Plastics Division**

New Butyl Tyre

Imperial Oil Ltd. will put on the market in Canada, probably this summer, a butyl rubber tyre developed in the United States by Esso Research. Claims for the new 'Bucron' tyre include elimination of tyre squeal, ability to stop in two-thirds the distance of conventional tyres and improved shock absorption.

Raw material will come from the Polymer Corporation, Sarnia, Ont., and the tyre will be built in Canada and marketed by Atlas Supply Co. of Canada Ltd., an Imperial Oil subsidiary.

Sir Andrew Murray has vacated his office of chairman and as a director of Bukit Tupah Rubber Estates.

Plastics and Rubber at Hanover

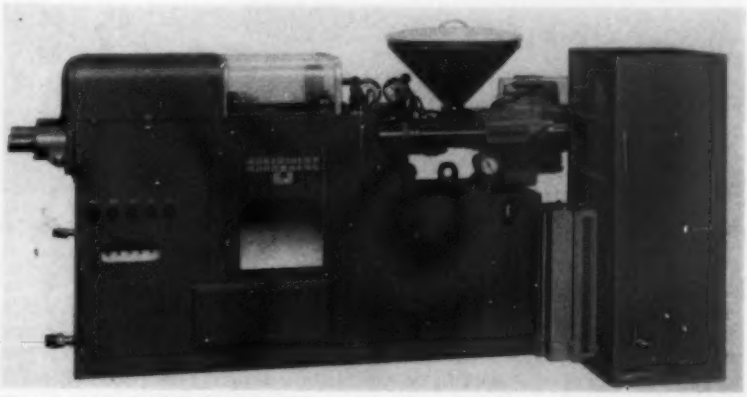
SECOND REPORT ON MATERIALS AND MACHINES

IT was good to see the familiar name of Windsor in one of the machine halls. Included in the exhibit, which attracted a great deal of attention, was the SP29 injection moulding machine. This is fully automatic with single screw pre-plasticizer suitable for thermoplastic materials including rigid PVC. Dependent upon materials and mould construction, the capacity moulded per shot of fully plasticized material is 29 cu. in. or 18oz. (510g.) in polystyrene. Plasticizing capacity per hour is 100lb. (45.4kg.). Mould closing force is 300 tons and actual injection time 1.5 seconds. Standard features include a mould safety device; automatic nozzle shut-off valve; infinitely variable hydraulic control of screw during plastification and infinitely variable screw speed. Motor is of 20hp. and heating unit consumption 11kW.

Also exhibited on the Windsor stand was a W-15 injection moulding machine, the first of the Windsor range to be manufactured in Germany by the company's subsidiary. This versatile machine can be operated on hand, semi, or fully automatic cycles. The plasticizing capacity per hour is 35/40lb. (16/18kg.). The number of shots per hour (dry cycling) 250-300 and capacity moulded per shot 4oz. (113g.).

Ankerwerk's V10-30 automatic injection moulding machine, said to be the smallest fast cycling machine with screw plastification, attracted considerable attention. It is capable of a maximum of 1,600 shots (dry cycling) per hour, the quantity moulded per shot ranging from 1.09 cu. in. with a pressure on material of 17,775lb./sq. in. to 3.05 cu. in. with a pressure of 6,400lb./sq. in. Screw speed is infinitely variable up to 120 rpm and the clamping force is 30 tons. The rated output of the pump motor is 6.7 hp. Also exhibited was the V14-60 which can mould a shot of approximately 8 cu. in (80cm³).

Centrifugal casting machine shown by Maschinenfabrik Stahlkontor Weser for the production of sheet, seamless pipe sections and moulded articles. Representatives in UK for this company, and for Hermann Berstorff machines referred to last week, are the International Corporation Ltd., London



The Ankerwerk V10-30, automatic injection moulding machine with screw plastification. Maximum number of shots (dry cycling) is given as 1,600 an hour

On the rubber side, the Fried. Krupp stand exhibited a range of tyre building machines and curing presses. Included were the HEB/Pirelli and the HEB/NRM range of tyre building machines, which can be fitted with programme control. The presses were of the HEB/McNeil 'Bag-o-Matic' design.

An interesting range of foamed materials were displayed by EMW Schaumstoff OHG. Included were both open and closed cell natural rubber foams available in various sizes and thicknesses. Polyurethane foamed materials, both polyester and polyether, were displayed in a very wide range of densities, colours and thicknesses. Others included open and closed cell PVC foams, many available in all colours, and foams laminated to plastics and fabrics.

On a well designed and extremely effective stand, Dunloplan exhibited a colourful range of floor tiles, both rubber and plastics, designed for home, office and school use. There was also a range of the very decorative 'picture' tiles in pastel colours. A continuous film show, consisting of a series of stills illustrating flooring patterns and accompanied by a commentary, attracted considerable attention.

A wide range of rubber processing and moulding machinery was seen on the stand of Leon Herbert, with whom Baker Perkins Ltd. have now concluded an agreement to manufacture some of these machines in the UK. Displayed were tyre building machines, Model RB3, for passenger car and motor cycle tyres for 12in. or greater rim diameter and for small truck tyres up to size 7.50-20, single bead; tyre curing presses, Aubo 30 and Velo-Aubo types, for various tyre sizes up to a maximum diameter of about 26in., and tyre width of 7¼in., and curing presses for a variety of rubber products.

Also of interest on the Herbert stand, and said to be exhibited for the first time anywhere, was a vulcanizer for tyre retreading, type EKN O. The EKN range has been well known for a number of years, and notable for the automatic stripping of the tyre from the mould. The latest addition carries the completely automatic control mechanism into a smaller size machine suitable for tyre sizes 6.70-13; 5.90-14; 5.90-15 and 5.00-16.

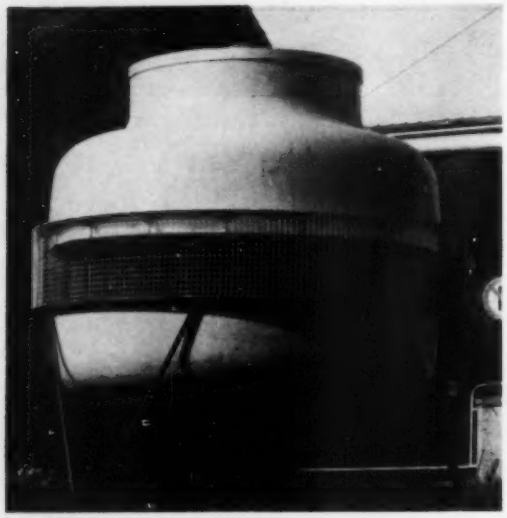
A variety of rubber cutting machines, crushers and the company's well known toothed disc mills were shown on the stand of Condux-Werk. Interesting, although not entirely new was the toothed disc mill model HZ8, equipped with automatic electric

feed attachment to regulate flow of material into the mill in relation to motor current.

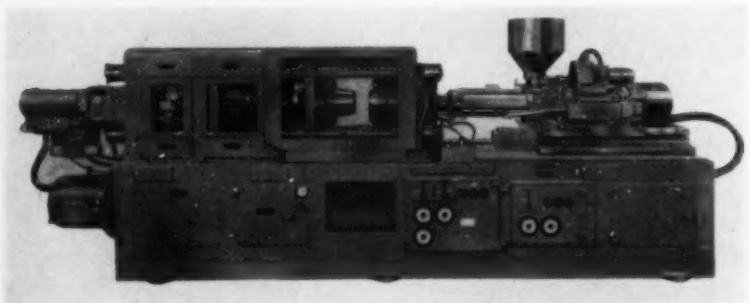
Asbest-und Gummiwerke Martin Merkel exhibited a wide range of their established products, such as stuffing box and piston packings for pumps, valves, etc., but it was also interesting to see the increasing use made by the firm of PTFE in and/or for articles ranging from packing rings and gaskets to sheathed bolt-heads, membranes and bellows. Types of polytetrafluorethylene used are I.C.I.'s Fluon, Du Pont's Teflon and the Hostaflon TF of Farbwerke Hoechst.

Blow moulding apparatus was being exhibited on the Battenfield stand. These ranged from the BEK 10, for articles up to 2.2 gallons capacity, each incorporating an extruder plasticizing unit and acumulator head. Plasticizing capacity, per hour in polythene, is 110lb. Screw diameter is 2.8in. at the feed hopper, 2.36in. at accumulator head. Screw length is 55in. The machine has four tie-bars, the distance between these being 19.6in., horizontally and 11.8in. vertically. Clamping pressure is about 90 tons.

Centre of interest on the Farbenfabriken Bayer stand in the plastics hall was again Makrolon (polycarbonate), exhibited in a number of uses including electrical and process engineering and in household goods. Bayer also exhibited in the electrical hall a comprehensive display of plastics including their Durethan BK (a polyamide) used for vacuum cleaners, lamps and some types of accumulator; Cellidor (cellulose acetate and cellulose acetate butyrate compounds) and Makrofol polycarbonate foil produced in thicknesses down to 10 micron. The company's synthetic rubbers, including Perbunan C (polychloroprene) were also displayed.



The casing of this Escher Wyss cooling tower, shown outside the refrigeration hall at Hanover, is made from polyester resin/glass



Shown on the R. H. Windsor stand was the SP 29 fully automatic injection moulding machine which is fitted with single screw pre-plasticizer

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High-density polythene has been added to the range of plastics marketed by Eastman Chemical Products, Inc. The Eastman Kodak Co. subsidiary announced the new material as having densities of 0.941 and higher.

Guinean Rubber Industry

GREAT FUTURE

THE rubber industry of Papua and New Guinea has a great future, Dato Gunn Lay Teik, the Malayan High Commissioner to Australia, said on May 10 at the end of his seven-day private tour of the territory.

The rubber he had seen in Papua appeared to be as good as that grown in Malaya, he said. However, the extent of the tapping here was not as good as in Malaya. Tappers were taking too much bark and were thus reducing the productive life of the trees. He said he thought much more rubber should be grown in the territory.

Official figures show that Papua has 26,724 acres under rubber production. Exports of raw rubber in the last financial year earned A£1m. Rubber is not grown commercially in New Guinea.

SPEED-TESTED NYLON

In order to prove that their new 'Champion' tyre could operate under the severest driving conditions, Firestone of Akron have carried out a series of tests highlighted by a special high speed endurance run at the Daytona Beach International Speedway. Runs at an average speed of 100 miles an hour for 100 miles were made, and the tyres are claimed to have performed perfectly, showing no sign of excessive wear or fatigue.

The Champion is a full size tyre, with a full tread depth, and nylon used in the cord body has a tensile strength of 30lb. The components that go into other Firestone tyres, such as chafer strips and reinforced beads are present in the new tyre.

No Solvent Needed

A solventless liquid epoxide resin/hardener coating system is now available from Bakelite which will provide a coating of up to 0.010-0.015in. thick in one application, suitable for structural steel work, most metals, wood and concrete. This system can be cured under widely varying conditions of temperature and humidity to give hard, tough and chemically resistant films.

UK Rubber Stocks

The following are the figures of London and Liverpool rubber stocks for April last (tons): landed, 11,141; delivered, 10,392; stocks (including B of T rubber), 14,542.

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Long Service at Silvertown

AWARDS IN RECOGNITION OF 2,660 YEARS

AT Silvertown on May 6, Dr W. D. Scott, managing director of BTR Industries Ltd., presented retirement certificates and long service awards to 75 employees of the Silvertown Rubber Co. Ltd., a subsidiary of BTR Industries.

The years of service involved totalled some 2,660, a truly remarkable figure and one that must, more than anything else, reflect the excellence of management-employee relations. Notable, too, was the award to Mr James G. Nelson for 50 years service, for he is the fifth member of his family to complete half a century of service with the company. The family total, taking into account other members, is over 350 years.

Welcoming staff, guests, relatives and friends, Silvertown director Mr G. E. Godfrey regretted the unavoidable absence of Sir Eric Mieville, Sir Walter Warboys and Mr P. D. Howard. It was, he said, fitting that Dr Scott should make the presentations because he was managing director of both companies, BTR and Silvertown.

In a short address after making the presentations, Dr W. D. Scott referred to the Silvertown of 100 years ago, when rubber was one of the newer materials. Silvertown then took the fullest advantage of the material it used and that, he said, was the object of the firm today, but rubber was no longer the only material at their disposal.

New Materials and Products

Rebuilding at Silvertown, he said, was going ahead, and these buildings housed products such as plastics pipes and fittings, and would house the manufacture of others, like extruded gaskets for refrigerators, magnetic gaskets for refrigerators—taking the place of a lock—and such materials as Plasticell with its interesting insulating properties.

After mentioning the reintroduction of the famous Silver King golf ball, the sales of which, he said, were going very well, Dr Scott made the first official announcement of BTR's decision to manufacture foam cushioning. This would be polyether polyurethane and production would be at Silvertown.

The long service awards consisted of 50 guineas (tax free) for 45 years service, men, and 40 years, women; a gold watch for 30 years and, for the first time, for 20 years a BTR tie, for men, and a BTR scarf for women.

Royal Expansion

North British Rubber are planning expansion of the manufacture and marketing of US Royal tyres in the UK. Recently the company held a special sales conference on Tyrex cord, the tyre cord developed by Courtaulds which has been used in US Royal tyres since the begining of the year.

W. E. Crook, general sales manager, said that the breaking strength of Tyrex was 13% higher than that in production in 1955, and 25% higher than that of 1953. Tyrex has been subjected to tests designed to investigate impact resistance, tread wear, tyre temperatures and tyre growth, and other features of tyres reinforced with Tyrex, nylon and standard high-tenacity rayon. North British claim that tyres reinforced with Tyrex have better resistance to impact, are superior to nylon in terms of tread-wear having an advantage on average of 12%.

A big advertising programme for the tyres is due to break this month.

UV ABSORBER FOR POLYOLEFINES

A new light absorber, Cyasorb UV 314, has been developed by the American Cyanamid Co. specifically to light-stabilize polyolefines. This compound, which is being marketed in the UK, is designed for application in the building, agricultural, car and ship-building industries where the combination of polymer and new light absorber is expected to solve weathering problems.

Even at absorber concentrations as low as 0.5%, low-density polythene is said to retain 60% elongation after four months' exposure to severe sun conditions. High-density polythene protected by 0.5% of the stabilizer is said to retain 88% elongation after a similar exposure.

Cyasorb UV 314—2,2′-dihyroxy-4-*n*-octobenzophenone — is a pale yellow powder that absorbs strongly in the 300-375 millimicron range of the ultraviolet. Its long alkyl group at the ether linkage makes it compatible with polyolefines.

Lower Price Tyre

Firestone have introduced a new tyre in their car range—the Firestone Standard, which, the company says, is being produced to meet the need in the market for a tyre of a lower price. The tread design is similar to the Firestone De Luxe, but the price is 15% lower.

It is available in six sizes: 4.50-17, 4.75/5.00-17, 4.75/5.00-18, 5.00/5.25-16, 5.50-16, 5.75/6.00-16.

Glass Fibre Price Dips

Turner Bros., of Rochdale, have announced price reductions throughout the range of 'Duraglas' rovings and woven roving and 'Duramat' chopped strand glass mats. This is, the company says, due to the introduction of new techniques in the production of glass filament and continuous capacity operation during a period of great expansion in the industry.

Storeys of Lancaster have opened their new showroom in Glasgow. The ceiling is covered in Varitiles (manufactured by British Plasterboard using Con-Tact). The panels show part of a selection of PVC leather cloths, both supported and unsupported

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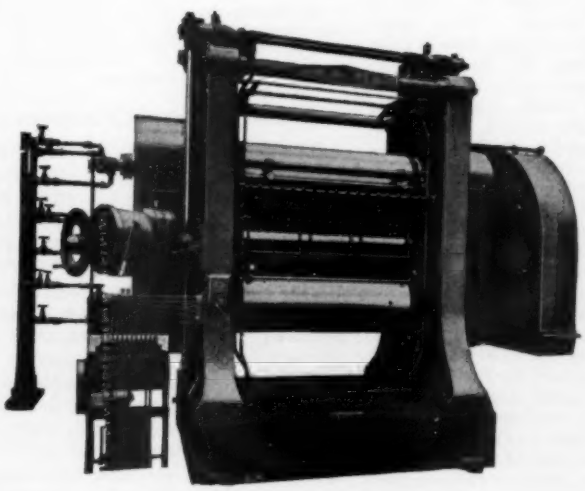

24" dia. x 68" face 3-ROLL EVEN and FRICTION SPEED RUBBER CALENDER, with Patent Nip Feed Guard, Circular Lubricating System from individually driven 12-point Forced Feed Lubricator with Self Filling Pumps. Mechanically Operated Elevating Unit for top and bottom Rolls. Variable Speed Drive to suit any requirement.

Institution of the Rubber Industry

REPORT ON THE 1959 EXAMINATIONS

(Continued from April 16 issue, page 590)

ESSAY

The six essays set were as follows (number of answers in parenthesis): a. What is rubber? (7). *b. Technician or technologist?* (1). *c. The design of experiments* (2). *d. The interdependence of science, technology and economics in rubber manufacture* (4). *e. The justification for synthetic rubber production* (27). *f. Speed* (3).

Never before has one subject attracted nearly two-thirds of the candidates. Even so, apart from three or four essays, the marshalling of facts, their historical and political evaluation, and the logical development of the writer's thesis on the justification for synthetic rubber production left much to be desired. In general, the examiners think that the level of quality of essay writing this year was lower than last year.

Despite being warned in the paper as set, candidates often reproduced lecture notes. It is originality and critical thinking which make an examiner happy and, if such freshness of thought is expressed clearly and interestingly, the examiner is very happy—and generous. Carelessness was shown in handwriting, spelling, abbreviations, punctuation and grammar; it appeared as cliches and colloquialisms. Clear, simple, accurate statements are to be preferred to floweriness and journalese.

The examiners regret that, apart from slips of the pen, there were many misspellings. Here are some: indepen*a*nt, inher*a*nt, tend*a*ncy, defin*a*te, exist*a*nce, del*a*terious. Will candidates please look up the meaning of 'ampersand' and then forget that it exists?

F. C. JENNINGS
J. H. CARRINGTON

REPORT

The inclusion of a report was new this year and, on the whole, was a success.

Some candidates failed to plan their time properly and did not finish their reports. The examiners could not do otherwise than penalize them. More instruction is clearly required on how to deal with these reports. 'Discussion', for instance, often took the form of putting physical test results into words, with little if any discussion of their implications. The 'conclusions' were frequently a re-hash of the 'observations'; alternatively, 'recommendations' were a re-hash of the 'conclusions'. Phrases such as 'on reconsidering the test results it is considered that' should be rigidly excluded.

Too many candidates failed to see the value of graphs, or even of tabulating or classifying the subjects under discussion. Candidates had all the available data before them but they failed, almost always, to criticize omissions or to make proposals for further work.

The regulations for the diplomas of the IRI say that the Associateship is the basic educational qualification for technical control positions in the industry. Candidates should therefore be competent to write a report using observed results or given data. This demands ability to assess and evaluate test results, and judgment in recommending a course of action which may involve the spending of large sums of money. Too frequently the thinking was slipshod or the recommendations evasive—and only occasionally was the economic aspect considered.

F. C. JENNINGS.
J. H. CARRINGTON.

PRACTICAL

The standard of practical work this year was about average and many candidates carried out their work in an efficient manner.

While there were a number of neat, well arranged scripts, there were others which left much to be desired. On the whole, the standard of English was good, but there were a few cases where considerable improvement could be made. Despite the prominence given to the necessity for a plan, many candidates either ignored this or did it in a half-hearted fashion, thereby losing credit.

As in previous examinations many candidates failed to give full details of their physical testing. Thus some merely presented average tensile data instead of giving all the relevant measurements leading to the calculation of the final result. Another common fault was the testing of too few specimens. Very few candidates satisfied all these requirements. The samples produced were in many cases excellent and in a few cases definitely poor. Cleanliness in working left much to be desired in the production of white and coloured specimens.

Most candidates attempting a question requiring them to match quinonedixoime cured, sulphur-free butyl compounds found sulphur to be absent and then added sulphur in their sample matching. In chemical analysis there was a distinct tendency to follow routine rather than to show initiative. Many candidates claimed that they were pressed for time, which is to be expected if they take time doing a moisture loss in duplicate, when looking for small quantities of foreign material in compounding materials. Polymer characterization was on the whole satisfactory, but many candidates failed to detect styrene in high-styrene resin polymers.

We are pleased to record our appreciation of the helpful cooperation and supervision of the teaching staffs and invigilators at the National College, Newton Heath and Ceylon Examination Centres.

B. J. HABGOOD.
L. R. MERNAGH.

LANGUAGES

FRENCH: A certain knowledge of French construction, idiom, and metaphor was needed if a good translation was to be produced. The subject-matter was simple enough, but those who missed the seven-league boots in 'l'industrie du caoutchouc et des plastiques a chaussé des bottes de sept lienes' made matters more difficult for themselves. Such diverse translations as 'expanded its rooms to nine (sic) premises', 'put seven miles on the service of boots', 'manufactured footwear in seven countries', 'made shoes', 'marched side by side' were offered. Only three candidates scored good marks.

GERMAN: Candidates should at least be able to deal with the title of a literature reference, yet only 7 out of 58 translated 'Atomstrahlung und Polymer-Wissenschaft' properly. Quite apart from renderings like 'atmospheric combustion' for 'atomic radiation' and the nouns 'state' and 'wealth' for the adjective 'rich' (reiche), few candidates seemed to read—or at least understand—the passage as a whole. Nevertheless ten candidates scored good marks.

R. J. MOSELEY.

(*To be concluded*)

Less Toxic Adhesives

The use of synthetic rubber based adhesives in a wide range of industries has had an unfortunate side effect, by increasing considerably the incidence of dermatitis amongst operatives handling them.

Plus Products Ltd. have carried out in close collaboration with a leading authority on industrial dermatitis, a programme of research to devise a completely new range of adhesives which would be acceptable to industry and yet reduce to a minimum the risk of dermatitis amongst operatives.

The company are now marketing a range of medically approved adhesives.

Plastics Statistics

MARCH EXPORTS AND IMPORTS

EXPORTS of plastics materials during March 1960 increased by 25% over exports for the same month last year; 16,093 tons were exported at a value of £4,021,314 (1959 figures—12,496 tons and £2,989,395). During the first quarter of the year exports stood at 44,562 tons (£11,376,979), an increase of 8,955 tons and £2,474,581 over the 1959 first quarter position of 35,607 tons and £8,902,398.

This is disclosed by the official Trade and Navigation accounts for March, which show that Hong Kong took the biggest single quantity (1,175 tons), followed by Australia (962 tons), Western Germany (879 tons) and South Africa (686 tons).

Imports during March were more than doubled: 8,815 tons (£2,804,737) compared with 1959 figures of 3,557 (£1,328,187). The figures for the first quarter of 1960 also show the same jump: 22,490 tons (£7,089,163) compared with 10,466 tons (£3,931,071). USA continued to be the major supplier with 2,756 tons, followed by Western Germany with 1,852 tons.

Details of imports of plastics materials during March, 1960, are as follows:

	Tons	£
Alkyd solid and liquid resins, solutions, emulsions and dispersions	294	61,015
Cellulose plastics:		
Photographic (including cinematograph) film base (except acetate butyrate)	196	260,617
All other	360	247,507
Polyvinyl chloride:		
Polymers and copolymers	1,955	271,270
All other	910	305,712
All other	5,100	1,658,616
Total	8,815	2,804,737

Exports of plastics materials during March, 1960:

	Tons	£
Acrylic sheet, rod, tube, film, foil and profile shapes in primary form	639	385,980
Alkyd solid and liquid resins, solutions, emulsions and dispersions	445	84,225
Aminoplastics:		
Solid and liquid resins, including solutions	776	97,315
Moulding and extrusion compounds	715	127,200
Cellulose plastics:		
Moulding and extrusion compounds	419	134,395
Sheet, rod, tube, film (excluding regenerated cellulose), foil and profile shapes in primary form	125	78,338
Phenolics and cresylics:		
Solid and liquid resins (straight and modified)	923	202,547
Other	499	198,241
Polystyrene	655	132,895
Polythene (polyethylene) sheet, rod, tube, film, foil and profile shapes in primary form	123	51,464
Polyvinyl chloride:		
Polymers and copolymers	1,926	263,321
Moulding and extrusion compounds	1,091	234,782
Sheet	549	249,188
Other	126	27,615
All other	6,257	1,662,764
Waste and scrap (including celluloid and film waste and scrap)	815	91,044
Total	16,093	4,021,314

UK exports to countries in the European Economic Community (Common Market) and the European Free Trade Association are shown below.

Exports to Commonwealth countries during the month were 4,887 tons (3,602 in March, 1959) and exports to all other foreign countries were 5,546 tons (3,865 tons).

EXPORTS TO EEC

	Mar. 1959	Mar. 1960
Western Germany	234	879
Netherlands	604	448
Belgium	627	539
France	1,346	448
Italy	429	801
	3,240	3,115

EXPORTS TO EFTA

	Mar. 1959	Mar. 1960
Sweden	508	628
Norway	421	446
Denmark	409	623
Switzerland	288	375
Portugal	478	356
Austria	80	117
	2,184	2,545

Patent Specifications

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Reclaiming Vulcanized Rubber

No. 828,162. US Rubber Reclaiming Co. Inc. Inventor: J. Green. Application and Filed, August 20 1956. Published, February 17 1960.

Vulcanized natural or synthetic rubber is reclaimed by mechanically working the rubber at a temperature of not less than 300°F. and in the presence of a reclaiming agent in a proportion substantially above 0.04 mol per 100 grams of rubber hydrocarbon. The reclaiming agent is an organic compound or a mixture of compounds of the class consisting of carboxylic acids, and anhydrides and esters of such acids, the compounds having a carbon-to-carbon double bond in the alpha position to a carboxylic carbon atom. The process differs from known reclaiming processes in that a higher proportion of the reclaiming agent is used and this results in the production of a reclaim showing considerable improvement in processing factor and other properties, including properties of the vulcanizate.

Fifty-one examples are given, relating to the reclaiming of the following and other types of vulcanized scrap: Whole tyre, natural rubber inner tube, SBR inner tube and butyl rubber tube. The reclaiming agents used in the examples include maleic anhydride, chloromaleic anhydride, maleic acid, fumaric acid, itaconic acid, citric acid, crotonic acid, methyl methacrylate, diethyl maleate, dibutyl maleate and others.

Vulcanizing Polymeric Materials

No. 828,328. Phillips Petroleum Co. Application and Filed, August 24 1956. Application in USA, September 15 1955. Published, February 17 1960.

Carbon black or other filler is incorporated in SBR and the mixture heated to at least 400°F. for sufficient time to cause the mixture to cure in the absence of any chemical vulcanizing agent. The process may be applied also to polybutadiene or copolymers of butadiene with another conjugated diene or with a monomer having a single vinyl group, provided that the copolymer contains at least 40 parts of butadiene per 100 parts of monomers. The proportion of filler may be 10 to 150 phr.

Examples are given of the curing of SBR, polybutadiene and two other copolymers of butadiene, a curing period of 45 minutes at 450° being generally used. Most of the examples relate to the use of carbon black but four other fillers were used in one group of tests, the carbon black and other fillers being added in a proportion of 50 phr. The process is not applicable to the curing of natural rubber, polyisoprene, neoprene or butyl rubber.

Rubber Markets

LONDON

After an early phase of uncertainty the market resumed the uptrend on short covering of June landed position here and technical squeeze for May at Singapore. High prices were paid for nearby No. 1 RSS and the market for this continued strong, but lower grades and distant landed positions remained relatively quiet.

Latest prices are as follows:

No. 1 RSS Spot: 42d. nominal.

Settlement House:

June 41d. nominal.

July/September 38d.-38½d.

October/December 35½d. nominal.

January/March 33½d. nominal.

April/June 33d. nominal.

No. 1 RSS cif basic ports:

May 39½d. nominal.

June 37½d. nominal.

Godown:

May 135 cents nominal.

LATEX

Centrifuged latex per gallon in drums, seller, June 21s. 2d., cif European ports, Spot, seller, 21s. 9d. Bulk, not quoted. Creamed, seller, June 20s. 8d. Normal, seller, June 16s. 8d.

DJAKARTA

Prices advanced slightly on May 9 following the rise in Singapore. Demand was strong but offerings were very scarce. Six tons of No. 1 sheet were sold at 52 rupiahs per kilo. The market closed steady.

	Rupiahs per kilo	
	May 9	Prev.
Spot No. 1 Priok ..	52.00b	50.00b
Spot No. 2 Priok ..	51.00b	49.00b
Spot No. 3 Priok ..	48.50n	47.50n
No. 1 fine pale crepe, spot	42.00b	41.50b

Tone: Steady

AMSTERDAM

The Amsterdam rubber market ruled as under on May 9:

	Guilders per kilo	
No. 1 RMA	May 9	Previous
May	3.61	3.55
June	3.59	3.52
July	3.57½	3.44
August	3.52½	3.44
September ..	3.48	3.44
July/Sept. ..	3.48½	3.44

Sales: 30 Tendency: Firm

SINGAPORE

The market opened steady on May 9 on better-than-expected overseas advices. May No. 1 sheet advanced on short-covering and reserve of sellers but there was no interest in lower sheets. Most forwards were offered at wider differentials. Profit-taking during the afternoon depressed prices for May delivery by about half a cent. May-June switching was passing at 4½ cents throughout. Lowers were in small and selective demand and all differentials were widening. Factories were quiet. The preliminary Malayan rubber exports figure for April had no effect on the market in view of the technical shortage of May delivery.

	Straits cents per lb., fob Malayan ports to open ports	
	May 9	Previous
No. 1 RSS, May	129 –129½	126½–126½
June	124½–124½	123½–123½
No. 2 RSS, May	122½–123½n	121 –121¾
No. 3 RSS, May	118 –119n	117 –118
No. 4 RSS, May	115 –116	113¾–114½
No. 5 RSS, May	111¾–112¾	111 –112½
No. 1 RSS, Spot	128¾–129½	126 –126½
No. 3 blanket thick remilled crepe, May ..	113½–115½	113 –115
No. 1 fine pale crepe, May ..	130 –131	128½–129½
2x thin brown crepe, May ..	113½–114½	112 –113

Tone: Quiet

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 243.60d. per gallon.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on May 9 was 38.50 (38.25) US cents per lb.

NEW YORK

The New York rubber market ruled as under on May 9:

DEALERS' PRICES

	US cents per lb. Ex-dock	
	May 9	Previous
No. 1 RSS, May ..	42½a	41½t
June ..	41a	40½a
No. 2 RSS, May ..	42½a	41¾n
June ..	40¾a	40¾a
No. 3 RSS, May ..	42a	41½a
June ..	40¾a	40½a
No. 1 RSS, Spot ..	42½n	41¾n
No. 3 amber blanket crepe, July	39½–39½	39½n
No. 1 latex thin crepe, May	44½n	44½n
No. 1 latex thick crepe, May	44½n	44½n

FUTURES—REX CONTRACT

	May 9	Previous Close
May ..	42.50b–42.65a	41.80b–41.85a
July ..	40.50b–40.55a	40.30b–40.35a
Sept. ..	39.62t	39.60b–39.65a
Nov. ..	39.10b–39.15a	39.05b–39.15a
Jan. ..	38.45b–38.55a	38.30b–38.50a
March ..	37.50b–37.65a	37.60b–37.85a
May ..	37.00b–37.25a	37.00b–37.30a

Sales: 55 Tone: Steady

Rubber futures were firm lead by nearby May on the advance abroad on May 9. Trading, however, was quite thin. Physical rubber was quiet and the undertone firm. In late trading rubber futures were at best steady, with the exception of nearby May which continued firm.

CEYLON

No. 1 RSS

The price of No. 1 RSS at Colombo on May 9 was 153½ (149½) Ceylon cents per lb.

COMPANIES in the NEWS

Snia Viscosa

The man-made fibre industry looks more promising in 1960 than it did last year, said Mr Franco Marinotti at the annual general meeting of Snia Viscosa held in Milan.

The company had a production of 235.4m. lb. in 1959, compared with 211.2m. lb. in the previous year. Lilion, the company's polyamide fibre, more than doubled its output during the year. Mr Marinotti said that the company, therefore, faces the problem of establishing a special plant where caprolactam, the raw material for Lilion, can be produced by simpler and faster processes than those traditionally used.

The industrial production of Krylion, an acrylic fibre, was also initiated during the year. Output of plastics in particular of Sniamide and Dialux, expanded further, as did that of the principal raw materials for the manufacture of man-made and synthetic fibres.

Bells Asbestos and Engineering

At the annual general meeting of Bells Asbestos and Engineering (Holdings) Ltd., the chairman, Mr C. W. Bell, announced group profits (before taxation) of £580,009. Interim dividend of 7½% had been declared, and final ordinary dividend is 12½%.

Referring to Ronald Trist, a subsidiary, the chairman said that this company had had a year of intense activity. The capital development programme designed to double the capacity of the precision rubber engineering works and create a larger and more modern rubber engineering laboratory was completed.

The results were most encouraging. 'Turnover and profits fulfilled expectations,' the chairman said, 'and my forecast is that the growth will continue to justify the administrative reorganization and the implementing of the productive facilities.'

Rubber Statistics

Due to pressure on space this regular feature has had to be held over. It will appear next week.

The United Kingdom Trade Commission, Accra, Ghana, has moved to a new office address at: Barclays Bank Buildings (Church Street Entrance), High Street, Accra, Ghana. The Post Office Box number '2649,' the telephone number 'Accra 4651,' and the telegraphic address 'Tradcom, Accra,' remain unchanged.

Industry INTELLIGENCE

Technical Data

Reoplex 641

Reoplex 641 (formerly called AD4/271) is suitable for plasticizing PVC cable insulation for use at high temperatures. Data for the properties of Reoplex 641 and results of heat ageing tests of PVC plasticized with this material are given in Technical Data Sheet No. 16, issued by The Geigy Co. Ltd., Rhodes, Middleton, Manchester.

Three other Reoplex plasticizers are included for comparison, namely, Reoplex 100, 110 and 220. The PVC compounds used contained 65 parts of PVC and 35 parts of plasticizer, and the tensile strength, elongation at break and change in weight of the PVC compounds were determined after heat-ageing for (a) 4 days at 136°C., (b) 7 days at 150°C., and (c) 60 days at 113°C. It is a requirement of many specifications for PVC cables for use at elevated temperatures that the elongation at break of the PVC shall not fall to less than 70% of the initial value after heat-ageing according to (c). All four Reoplex plasticizers tested meet this requirement, although Reoplex 220 shows a rather high weight loss when heat-aged for 7 days at 150°C. Of the other three plasticizers, Reoplex 641 is the easiest to process and has the best flexibility at low temperatures.

Polysar Krynac 804

Polymer Corporation announce the introduction of Polysar Krynac 804 in Polysar Technical Report No. 8: 10A by R. C. Klingender. This report is distributed in this country by Polymer (UK) Ltd., Walbrook House, Walbrook, London, E.C.4.

Polysar Krynac 804 is a non-staining terpolymer of acrylonitrile, butadiene and divinyl - benzene. Substitution of Polysar Krynac 804 for part of the elastomer in nitrile compounds reduces nerve and shrinkage and improves calendering and extrusion properties of the compound. Polysar Krynac 804 has oil resistance similar to that of Krynac 800 and 803. The report gives figures showing the improvement in processing of a typical gasket compound obtained by substituting 804 for 800 in amounts of 25, 50, 75 and 100% of the total elastomer. A study is also made of the effect of these variations on the physical properties of the vulcanizate and the processing characteristics of the compound. The improvement in processing is accompanied by a reduction in tensile strength and tear resistance, but a slight improvement in aged results and compression set, and a rise in the brittle point temperature.

This development is claimed to be of value in the calendering of such products as plate gums, printing blankets, roll cover and other sheet material and the extrusion of gaskets, seals, tubes, etc., especially in the more lightly loaded compounds and complicated extruded cross sections.

Synpol Oil-Extended Polymers

Texas US Chemical Company 260 Madison Avenue, New York 16, N.Y., announce in data sheets 7, 8 and 9, a new oil-extended polymer, Synpol 8208A, and two oil-extended carbon black masterbatches, Synpol 8255B and 8267A.

8208A contains 50 phr of a naphthenic oil and is stabilized with a non-staining, non-discolouring stabilizer. It is designed to give exceptionally high resistance to discoloration and staining for use in products such as car mats, floor tiles, shoe soles and light coloured extruded goods.

8255B is a black masterbatch containing 75 phr of HAF black and 50 phr of a highly aromatic oil, and offers a combination of economy, improved dispersion and ease of processing. 8267A is similar to 8266, contains 60 phr of ISAF black and 37.5 phr of aromatic oil, and is considered suitable for products such as tyre treads and mechanical goods.

Epok A.3901, Epok A.3904 Polyester Surface Coating Resins

Information sheets No. E.120 and No. E.121, obtainable from Information Department, British Resin Products Ltd., Devonshire House, Piccadilly, London, W.1, give details of two new polyester surface coating resins, Epok A.3901, which is a solution of a polyester resin in styrene and contains a small percentage of dissolved paraffin wax, and Epok A.3904, which is a wax free polyester resin. The resins are mixed with a peroxide catalyst and metal promoter before use to give air drying lacquers which have excellent flow properties and are free from cissing and catering. The resins confer a high gloss, excellent mar resistance and a high build is obtainable on a single application. They are rapid drying and whilst giving a very hard coating they retain a degree of flexibility which minimizes tendencies to lift or crack.

A.3904 is particularly suitable for pigmented coatings and both resins are ideal for application on wood, hardboard, asbestos, metal, paper and plasterboard.

Anti-Flexcracking Properties of Nonox EX and WSL

Data showing the effects of Nonox EX and Nonox WSL in a simple white natural rubber compound and in one reinforced with carbon black are given in Technical Information sheet Rubber PC/R.67 issued by the Polymer and Chemicals Service Department, Dyestuffs Division, Imperial Chemical Industries Ltd. Although these products are not as effective as the acknowledged anti-flexcracking antioxidants, both are non-staining and find use in black stocks where migration staining must be reduced to a minimum.

Terylene Braided Neoprene Hose: Method of Bonding Cords

In the past, some manufacturers of neoprene - based oil - resisting braided hose have found difficulty in obtaining satisfactory adhesion between the terylene braiding and the elastomer. A suitable adhesive formulation and details of a method of fabrication that has given satisfactory results on a production scale are given in Technical Information Sheet Rubber PC/R.68, issued by the Polymers and Chemicals Service Department, Dyestuffs Division, Imperial Chemical Industries Ltd.

Machines, Materials and Equipment

Morehouse Machines Available for Test

Durham Raw Materials Ltd. (1/4 Great Tower Street, London, E.C.3), who act as agents for Morehouse International of Los Angeles, now say they are able to supply a Morehouse Mill and a Cowles Dissolver on loan to firms wishing to study the productive capacity of these machines. The Cowles is a Laboratory Lift-up Type 1-VG.

The important feature of the Cowles Dissolver is its patented impeller. The narrow impeller vanes, travelling at speeds up to 6,000 fpm impart an extremely high velocity to the material and create a zone of intense turbulence immediately surrounding the impeller. The high velocity material impinges on the surrounding slower moving portions with 'hydraulic attrition'—a combination of violent impact with the shearing of particle against particle. This greatly multiplies the mechanical action of the impeller.

During the dispersion of solids in liquid media, hydraulic attrition breaks down the solids to ultimate dry particle size and surrounds each particle with a film of liquid. This same action is of great importance in chemical reactions to expose the greatest possible area of reactants to each other. As a dissolver, the impeller fractures friable materials, shreds soft ones and strips away softened material to expose new layers to solvent action. As an emulsifier, the impeller reduces the dispersed phase to minute particles surrounded by the continuous phase, readily and with a minimum of aeration.

Batch sizes can vary up to 6,000 gallons for the largest production models but are dependent upon viscosity and nature of material being processed.

In the Morehouse Mill grinding is

carried out between two special grinding stones, one of which is rotated at speeds up to 9,800 fpm. The distance between the stones is micrometer-adjustable from positive contact to about ¼in. in steps of .001in. Adjustments can be made during operation, and the mill can be locked in position.

Highest production rates are said to be reached at minimum temperatures, quietly and without vibration. The stones are self-sharpening, do not glaze, and no dressing is required. They can be replaced in minutes.

Besides grinding, the mill can be used concurrently for dispersing, mixing, emulsifying, homogenizing, and disintegrating.

New Publications

New Packaging techniques with Rigidex

A new leaflet issued by British Resin Products Ltd. describes the growing use of Rigidex high density polythene in the field of packaging, where this material has made it possible to provide packs and packaging methods which could not be achieved as effectively or as economically in other materials. The properties of Rigidex, superior temperature resistance, lower permeability and excellent resistance to oils, grease, chemicals and most common solvents, are described in connexion with a wide variety of packaging applications. Among those discussed are boilable packs, clear film for carton over-wrapping, detergent bottles, closures and thin-walled containers.

The leaflet is available on request from Information Department, British Resin Products Ltd., Devonshire House, Piccadilly, London, W.1.

Lacrinoid Products Ltd. have added a 2½ gallon Handycan to their range of polythene containers. It retails at 25s. 6d. and is said to be particularly suitable for the caravan and camping enthusiast.

BOOK REVIEW

COMPILATION OF STANDARDS RUBBER PRODUCTS, D-11 (American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.) 1,052 pages, hard cover, $9.75, ASTM members $780.

This 19th edition of the D-11 compilation is over 10% larger than the last edition published in May 1958. Its 163 standards include 22 that are completely new and 66 that have been revised or changed in status. Among the new standards are several covering cellular materials of polyvinyl chloride or copolymers and urethane foam, two on the effects of radiation, one on abrasion resistance of rubber soles and heels, one on testing automotive air conditioning hose, and several prepared by Committee D-24 on Carbon Black.

Selected topics include the following: Chemical tests of vulcanized rubber; physical tests of vulcanized rubber; electrical tests; ageing and weathering tests of rubber; low-temperature tests of rubber; automotive and aeronautical rubber; packing and gasket materials; hose and belting; tape; electrical protective equipment; insulated wire and cable; hard rubber; latex foam; sponge and expanded cellular rubber; synthetic elastomers; compounding materials and nomenclature and definitions.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London S.E.1.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

Fifteenth Foundation Lecture. — Friday May 20 at 4 p.m. at the Central Library Theatre, Manchester. 'High Polymers. The story of an age in principle and practice,' delivered by Maldwyn Jones, B.Sc., F.I.R.I.

Sixth Exhibition of Plastics Materials and Rubber, Paris.—May 14-29. A conference on plastics and rubber will be held for three days during the exhibition.

Blue Peter Retreads Ltd. recently held a celebration in Salisbury to mark the presentation of the 'Blue Peter' sales cup to Stevco Ltd., Salisbury, who had competed with distributors all over the UK in this annual event. H. R. J. De Keyser (*left*), general sales manager of Blue Peter Retreads, presented the cup to C. H. Lansley

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on March 30 1960

Imperial Chemical Industries Ltd. Treatment of polymers. 831,347.

Onderzoekingsinstituut Research N.V. Apparatus for the manufacture of curled thermoplastic threads according to the false-twisting method. 831,549.

Firestone Tire and Rubber Co. Tubeless tyre and rim thereof. 831,601.

Badische Anilin- and Soda-Fabrik A.G. Production of cyclopolyolefines 831,350.

Commissariat a L'energie Atomique. Creep-testing machines. 831,579.

Phillips Petroleum Co. Olefin polymerization process. 831,581.

Resistoflex Corporation. Production of preforms and longitudinally curved articles of polytetrafluoroethylene resin. 831,754.

Firestone Tire and Rubber Co. Tubeless tyre and chafer therefor. 831,618.

Gulf Research and Development Co. Purification of isoprene. 831,357.

Dow Chemical Co. Catalyzed halogenation of polyolefines. 831,358.

Firestone Tire and Rubber Co. Apparatus and method of manufacturing air springs. 831,625.

Firestone Tire and Rubber Co. Rubber article and method of manufacture. 831,764.

Esso Research and Engineering Co. Radiolytic polymerization of cyclopentadiene. 831,319.

General Tire and Rubber Co. Emergency tyre. 831,767.

Open to public inspection on April 6 1960

Rolls-Royce Ltd. Articles of reinforced silicone elastomers. 831,863.

Leicester, Lovell and Co. Ltd. (Borden Co. Inc.). Curing agents for epoxide resins. 832,188.

Leicester, Lovell and Co. Ltd. Curing agents for epoxide resins. 832,189.

British Rubber Producers Research Association. Preparation of polymeric mixtures and compounds. 832,193.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Process for multi-colour printing on hard foils of polyvinyl chloride. 832,348.

American Cynamid Co. Water-soluble melamine-formaldehyde condensation polymers. 832,203.

Bataafsche Petroleum Maatschappij N.V. De. Polmerization of olefins. 832,204.

Ciba Ltd. Reaction products of complex metal compounds of mono-azo-dyestuffs with basic dyestuffs and process for their manufacture. 832,206.

Petrochemicals Ltd. Polymerization of mono-olefins. 832,205.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Manufacture of shaped structures such as filaments or foils from high-melting linear polyesters. 831,961.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Process for the manufacture of copolymers. 832,207.

Telegraph Construction and Maintenance Co. Ltd. Thermoplastic materials. 832,065.

Regie Nationale Des Usines Renault. Preparation of chemically reactive allylcellulose. 831,969.

Montecatini Soc. Generale Per L'Industria Mineraria E Chimica. Synthesis of carboxylic acids from olefinic compounds, carbon monoxide and water. 832,212.

Ciba Ltd. Peptides and derivatives thereof, and process for their manufacture. 831,973.

Midland Silicones Ltd. Organosilicon compositions. 832,224.

Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius and Brüning. Halogenated bicyclo-[2:2:1]-heptenes and a process for their manufacture. 832,226.

Montecatini Soc. Generale L'Industria Mineraria E. Chimica. Hydroperoxides of synthetic high molecular weight polymers and process for their preparation. 832,068.

NEW COMPANIES

Cork Manufacturing Company (Chingford) Ltd. (653,399).—March 22. Capital: £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in gaskets and gasketting materials and seals in cork, synthetic and natural rubber, plastics, paper, metal, asbestos and other materials. The first directors are to be appointed by the subscribers. Solicitors: Theodore Goddard and Co., 5 New Court, W.C.2.

A.B. Plastics (Rainwater) Ltd. (653,589). —March 23. Capital: £100 in £1 shares. To carry on the business of engineers, founders, moulders, extruders of plastics, etc. The directors are: John R. Newman, Wild Acre, Butlers Dene Road, Woldingham; Bernard W. Brixey, 31 Park Drive, S.W.14. Reg. office: 1 Guildhall Chambers, Basinghall Street, E.C.2.

East Coast Plastics Ltd. (653,614). — March 23. Capital: £12,000 in £1 shares. The directors are: Ronald E. G. Robertson, "Cliffside," Cromer Road, Mundesley-on-Sea, Norfolk; John M. Place, Mulberry House, The Avenue, Wroxham, Norfolk; Edward C. C. Cole and Michael E. Peach. Reg. office: 71 The Close, Norwich.

Vinyl Compositions Ltd. (653,486). — March 22. Capital: £2,000 in £1 shares. To carry on the business of manufacturers of and dealers in plastic, modelling and moulding materials, etc. The directors are: Kenneth Burgess and Mrs. Barbara A. Burgess, both of 263 Parrs Wood Road, South Didsbury, Manchester, 20. Reg. office: 66 Mosley Street, Manchester.

Rotaflex (Iran), Ltd. (653,659).—March 23. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastics; in particular to handle Rotaflex products in Iran, etc. The directors are: Bernard Stern and John D. Vanstone. Secretary: Thomas A. Herbert, 156 Strand, W.C.2.

Coventry Laminates Ltd. (652,678). — March 16. Capital: £100 in £1 shares. To carry on the business of manufacturers and designers of and dealers in plastic and resin bonded glass fibre laminates, etc. The directors are: Geoffrey F. Batey, "The Knob," Stretton-on-Dunsmore, near Rugby; John D. Barnett-Hunt, 51 Heather Road, Binley, Coventry; Leonard Adams, 26 Broadway, Coventry. Reg. office: 51 Heather Road, Binley, Coventry.

Decor Laminates Ltd. (653,959). — March 25. Capital: £100 in £1 shares. To carry on the business of manufacturers, fabricators, wholesalers and retailers of and dealers in all types of glass and glass products, including fibre-glass, glass silicates and similar organic or inorganic substances and plastic materials of all kinds, etc. The directors are: John E. Purdie, 13 Edmunds Walk, N.2; Albert J. Faver, 1 Glenwood Gardens, Ilford; Ronald E. Goldsmith, Edmund J. Sams, David A. Handley and Bruce J. Samson. Reg. office: 53 Corsica Street, N.5.

J. and T. Plastics Ltd. (653,974).—March 25. Capital: £100 in £1 shares. The directors are: Ivy S. Taaffe and Louisa J. Johnson, both of 73 Blanmerle Road, S.E.9. Reg. office: 73 Blanmerle Road, S.E.9.

Robert W. Jones (Rubber) Ltd. (654,002). —March 25. Capital: £1,000 in £1 shares. To carry on the business of general merchants and storekeepers, exporters, importers and suppliers of and dealers in rubber produce, etc. The directors are: Robert W. Jones, "Caelo," Church Lane, Hooley, near Coulsdon, Surrey; Wong Yong Shin, 15 Conway Grove, Singapore 19. Reg. office: 25 Holborn Viaduct, E.C.1.

Luxspa Ltd. (654,125). — March 28. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastic, modelling and moulding materials, etc. The first directors are to be appointed by the subscribers. Secretary: Thomas A. Herbert, 156 Strand, W.C.2.

M.1 Tyre Service Co. Ltd. (654,504). — March 29. Capital: £1,000 in £1 shares. The first directors are to be appointed by the subscribers. Secretary: D. S. Gray. Reg. office: Main Street, Willoughby, near Rugby.

Nuthall Plastics Ltd. (654,615).— March 30. Capital: £500 in £1 shares. To carry on the business of manufacturers of and dealers in fancy goods, etc. The directors are: David H. Green and Joyce M. Green, both of 124 Nottingham Road, Nuthall, Notts. Reg. office: 124 Nottingham Road, Nuthall, Notts.

R. P. Lee Ltd. (654,510). — March 29. Capital: £1,000 in £1 shares. To carry on the business of dental mechanics, prosthetic suppliers, etc. The directors are: Ronald P. Lee and Mrs. Mauria Lee, both of 2 Frognal, N.W.3. Reg. office: 214 Bishopsgate, E.C.2.

Clean Plastic (Pontyclun) Ltd. (654,462). —March 29. Capital: £2,000 in £1 shares. To carry on the business of manufacturers of and dealers in goods made of plastic, polythene, etc. The directors are: Tudor John, Castle House, Llantrissant, Glam.; Walter A. Baberg, Heidelberg, Danygraeg, Talbot Green, Glam. Reg. office: Castle House, Llantrissant, Glam.

Measom Freer and Co. Ltd. (654,605).— March 30. Capital: £10,000 in £1 shares. To carry on the business of manufacturers, moulders, manipulators and shapers of all kinds of metal, plastics, concrete, glass, fibre glass and timber for industrial, commercial, domestic or other purposes, etc. The directors are: Robert G. Freer and Mrs. Eva P. E. Freer, both of 46 Lutterworth Road, Leicester (plastics manufacturers). Reg. office: Injectoid Works, Pullman Road, Wigston, Leics.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

(781,185) Banners and pennants, all made of plastics (not in imitation of textile materials). Robert Balfour Gibb and John Shepherd, trading in co-partnership, 5 Main Street, St. Ninians, Stirling, Stirlingshire. (Class 20; March 8 1960).

ROVIC (791,324) Textile materials in the piece being goods coated with synthetic resin and for use in making lampshades. Rovic Ltd., 8 Criterion Arcade, Bournemouth, Hampshire. (Class 24; March 8 1960).

RILSTIK (795,807) (Adhesives (being stationery). Rubber Improvement Ltd., Rilex House, 2 Chandos Street, London, W.1. (Class 16; March 8 1960).

SOLAR (786,179) Perambulator tyres and cushion tyres. R. Woolf and Co. (Rubber) Ltd., Hayes Bridge, Uxbridge Road, Hayes, Middlesex. (Class 12; March 15 1960).

(792,791) All goods included in Class 9 made wholly or substantially wholly of nylon. Société Rhodiaceta, 21 Rue Jean-Goujon, Paris 8e, France. Address for service is c/o W. Symmons and Co., 329 High Holborn, London, W.C.1. (Class 9; March 15 1960). The same mark has been registered under classes 11, 16, 17, 18, 19, 20, 21 and 28.

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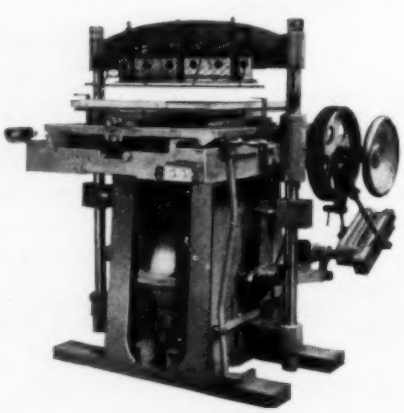

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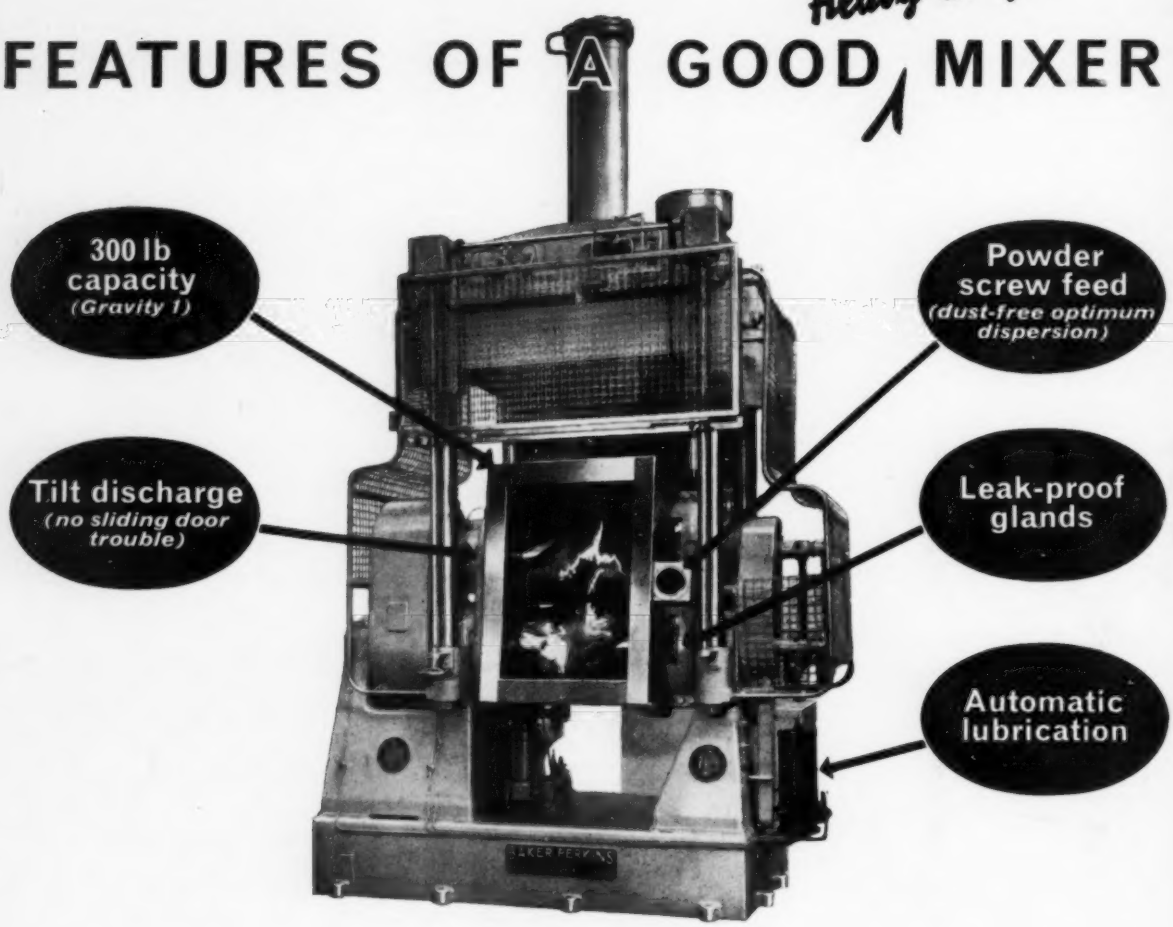
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